ROBIN RIGG OFFSHORE WIND FARM (NAVIGATION AND FISHING) (SCOTLAND) BILL COMMITTEE

Monday 24 February 2003

Session 1

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ROBIN RIGG OFFSHORE WIND FARM (NAVIGATION AND FISHING) (SCOTLAND) BILL COMMITTEE

1st Meeting 2003, Session 1

THE CONVENER

*Mr Tom McCabe (Hamilton South) (Lab)

THE DEPUTY CONVENER

*Colin Campbell (West of Scotland) (SNP)

COMMITTEE MEMBERS

*Mr John Home Robertson (East Lothian) (Lab)
*Mr Jamie McGrigor (Highlands and Islands) (Con)
*Mr Mike Rumbles (West Aberdeenshire and Kincardine) (LD)

*attended

THE FOLLOWING ALSO ATTENDED:

Mr Euan Mackenzie (Counsel for Solway Yacht Club and Royal Yachting Association)
Mr Marcus Trinick (Counsel for the Promoters)

WITNESSES

Mr Dan Badger (Offshore Energy Resource Ltd)
Mr John Beattie (Anatec)
Mr Alfred Bennett (Solway Shell-Fishermen's Association)
Mr James Copland (Solway Yacht Club)
Mr Alan Cubbin (Maritime and Coastguard Agency)
Mr Jerry Eardley (Royal Yachting Association)
Mr John Gallagher (QinetiQ)
Mr Rupert Steele (TXU)

CLERK TO THE COMMITTEE

David Cullum

SENIOR ASSISTANT CLERK

Alison Campbell

ASSISTANT CLERK

Zoé Dean

LOCATION

Town Hall, Kirkcudbright

Scottish Parliament

Robin Rigg Offshore Wind Farm (Navigation and Fishing) (Scotland) Bill Committee

Monday 24 February 2003

[THE CONVENER *opened the meeting at 10:34*]

The Convener (Mr Tom McCabe): Good morning, ladies and gentlemen, and welcome to this meeting of the Robin Rigg Offshore Wind Farm (Navigation and Fishing) (Scotland) Bill Committee. This is the second time that we have visited the area. At our previous meeting, which was in Dumfries, we agreed to come to Kirkcudbright for the consideration stage. I offer a special welcome to the members of the public and press who have come along—I hope that they find the proceedings interesting and worth while. I also welcome David Mundell, who is a regional member of the Scottish Parliament for the area. I thank him for coming along.

There are two reasons for this morning's meeting. The main reason is to take evidence at the consideration stage of the bill—we will hear detailed evidence from the objectors from whom we agreed to take evidence at the previous meeting. The other reason for the meeting was to allow members to have a look at the site. Members felt that it was important to visit the site to get a better perspective and to see how the operation of a wind farm might impact on the area. We have done that this morning, which will assist us in our deliberations as we conclude our final report later in the proceedings.

The evidence taking at the consideration stage of a private bill is slightly different from evidence taking on other bills, in that the objectors and the promoters may cross-examine each other. That will be done on their behalf by counsel whom they have appointed. Counsel for the promoters is Mr Marcus Trinick and counsel for the Royal Yachting Association and the Solway Yacht Club is Mr Euan Mackenzie.

In accordance with the committee's wishes, each witness will be required to take an oath or make a solemn affirmation, whichever they choose. The reason for that is that the proceedings in the committee are somewhat different from those in other committees. We operate in a quasi-judicial capacity and the outcome of the proceedings could be subject to legal challenge. We have therefore decided that each witness should give evidence on oath. I remind the witnesses that they should contain their remarks to the evidence that they submitted in their precognition statements. I think that that point was explained to them previously.

Unless members of the committee wish to clarify anything, I will move on.

Item in Private

The Convener: The committee is asked to consider whether to take agenda item 4, which is consideration of our eventual report, in private. Are members happy to take that item in private?

Members *indicated agreement*.

Robin Rigg Offshore Wind Farm (Navigation and Fishing) (Scotland) Bill: Consideration Stage

The Convener: Our first witness is Mr John Beattie, who is a senior risk analyst with Anatec. He is here to give evidence on the collision risk in relation to wind farm structures and leisure craft. I invite Mr Beattie to stand and to take the oath or make an affirmation, whichever he prefers.

MR JOHN BEATTIE *made a solemn affirmation.*

Mr Marcus Trinick (Counsel for the Promoters): Mr Beattie, you have in front of you your precognition, which the committee members also have as part of their bundle of papers. To save time, I will not ask you to read the precognition or to introduce yourself. All the details are in the precognition.

I have four quick questions and Mr Mackenzie might have others. The first relates to paragraph 10 on page 2 of your precognition, which identifies two general routing options for leisure craft crossing the relevant part of the Solway firth—the recommended route and the direct route. Those routes are shown in figure 1, which is underneath paragraph 12. It may be suggested that vessels other than those that are using either the direct or the recommended route navigate in the area of the proposed wind farm. Can you comment on that suggestion?

Mr John Beattie (Anatec): To identify which routes could interact with the wind farm, we took advice from the Solway Yacht Club, which submitted evidence on leisure craft usage in the area. Its information was that the trans-Solway route crossing from the Galloway coast to Cumbria was most likely to come into proximity with the wind farm. The club also identified the general routing options. The recommended route, as given in the sailing directions, is to keep clear of the south of the Two Feet bank to avoid the shallow water and shoals in the area. It is recognised that some yachts take a direct route—straight across the Solway firth—to save time, if the conditions are suitable.

Mr Trinick: Paragraph 18 on page 3 of the precognition refers to data on maritime casualties. How confident are you that the records that you produce are sufficiently comprehensive for the committee to have confidence in them?

Mr Beattie: The information comes from the coastguard incident database, which is very comprehensive. It includes all situations in which we foresee that a vessel might get into difficulty and risk being in the area of the wind farm without control. Those include machinery failure; sail, mast or rigging failure; taking in water; and vessels being unsure of their position. The incident database matches the reasons that the Royal Yachting Association cited for vessels being driven into the area of the wind farm. The association, too, specified machinery failure, adverse weather and so on.

Mr Trinick: My second-last question relates to figure 3 on page 4 of the precognition. You may also want to refer to figure 5 on page 8 of document PM5—RR/03/1/10 in the parliamentary bundle—which is your technical note to the navigational risk assessment. An enduring difficulty for anyone attending the meeting is that copies of the document are in black and white, whereas the original is in colour. For that reason, I would like you to interpret it for us. Is figure 3 in your precognition derived entirely from figure 5 in the technical note?

Mr Beattie: Yes.

Mr Trinick: I was puzzled when I saw figure 3 in the precognition, because it seemed to indicate that there was a high incident rate both in an area in the middle of nowhere and in an area close to Anglesey. Can you clarify that?

Mr Beattie: As Mr Trinick indicated, the problem has arisen because the information was distributed in black and white, whereas the originals were in colour. We have used colour coding to indicate the density of incidents in different parts of the United Kingdom. We have used dark red to indicate a high density of incidents and dark blue to indicate a low density. That has led to some confusion in the black-and-white copies.

The cell encompassing most of Anglesey is dark red. It is identified as a high-activity area and HM Coastguard has responded to a large number of incidents there. The cells to the south-west of the Isle of Man are colour coded dark blue, because there has been a low density of incidents there. In the two cells in the Solway firth, HM Coastguard responded to a low to moderate number of incidents. That reflects the findings of the consultation that we carried out with the RYA, which suggested that activity in the Solway firth was low to moderate.

Mr Trinick: For the benefit of the committee, we can leave a colour copy of the precognition with the convener.

The Convener: We have one.

Mr Trinick: You have an advantage over me.

I refer Mr Beattie to paragraph 47 on page 8 of the precognition. The relevant part of the paragraph for the purposes of the question is the final sentence, which states:

"a unique number will mark each tower such that any vessel in trouble within the wind farm perimeter can report its exact position".

What advice would you give to the promoters of the bill about the minimum visibility of such numbers in conditions where visibility was good?

Mr Beattie: If a vessel were to find its way inside the wind farm, the number should be visible from a position midway between any two adjacent turbines so that the turbines can be identified and the vessel's location can be easily identified when the coastguard is spoken to. That would mean that the rescue services could easily identify where the vessel was.

10:45

Mr Euan Mackenzie (Counsel for the Solway Yacht Club and the Royal Yachting Association): Mr Beattie, I understand that your precognition does not deal with the risk of mast-blade interaction—that is, the risk of a blade in the turbine colliding with the mast of a boat. Are you the author of a report by Anatec from June 2002 entitled "Robin Rigg Offshore Wind Farm—Navigation Risk Assessment", which is before the committee as paper RR/03/4/10?

Mr Beattie: Yes.

Mr Mackenzie: Do you have a copy of that report before you?

Mr Beattie: I do.

Mr Mackenzie: Unfortunately, the copy of the report that is before the committee has been e-mailed and there has been a problem with the numbering of the paragraphs. However, paragraph 5.4 of the report deals with turbine clearances. It states:

"The spring tidal range in this part of the Solway is 7.4m giving a normal minimum blade tip height above the sea surface (for the lowest blade tip position) of 26.3m at spring high tides".

Is it correct that the lowest blade tip position is when the blade is in the 6 o'clock position?

Mr Beattie: That is correct.

Mr Mackenzie: So when the blade is in the 6 o'clock position, there would be a blade clearance of 26.3m at spring high tides in the proposed development, as it was envisaged at that stage.

Mr Beattie: That was the best information that was available at that time.

Mr Mackenzie: Paragraph 5.4 goes on to say that the 26.3m normal minimum blade tip height decreases

"to 19.3m for the extreme conditions of the highest astronomical tide combined with 1 in 50 year surge and a 1 in 50 year wave."

Am I right in thinking that, from the clearance of 26.3m, you have allowed 7m for extreme conditions?

Mr Beattie: We did that study during the preparation of the environmental statement, but I believe that Mr Badger's work has superseded that information. He has gone into more detail on the matter and I believe that he will discuss different heights and tidal conditions today. I have not looked at that matter since the report was done, but I believe that Mr Badger has collected much more detailed information on it.

Mr Mackenzie: I appreciate that and I will ask Mr Badger about it. However, I am interested in the fact that, when you considered the matter in August 2002, your expert opinion was that 7m should be allowed for extreme conditions. Is that correct?

Mr Beattie: That is correct. As is set out in our report, when we were asked to consider the matter, our main concern was for commercial shipping and fishing vessels. However, it was felt that recreational craft should also be considered in navigational assessments. We collected some information and repeated information that was included in the environmental statement in our report.

I know that the RYA felt that it was important to consider the navigational effect on yachts, but we did not go into too much detail on the subject. The figures that we quoted came from other sources. That is why Mr Badger, who I know has done much more detailed work on this area, would be best qualified to respond.

Mr Mackenzie: I have no further questions.

The Convener: Thank you. As there are no further questions from the committee, I have one final question for Mr Beattie. Does your methodology comply with the guidance notes that were issued by the Maritime and Coastguard Agency? If not, in what areas does it differ and why was the guidance not followed?

Mr Beattie: The precognition includes a quantification of the risk of collision between yachts and the wind farm structures. There is no mention of quantification of risk in the guidance notes, which is why there is no methodology to follow and no methodology from which to deviate. We came up with what we considered to be the best available methodology based on our experience of assessing the risk of collision.

The Convener: Okay. Thank you. I am sorry, Mr Beattie, there is one last question from the committee.

Mr Jamie McGrigor (Highlands and Islands) (Con): On a foggy day when visibility was poor, a vessel could become caught in the wind farm. I

note from your report the use of yellow bands and numberings, but will there be anything on the turbines to tell an inexperienced sailor how to get out of the wind farm? I am thinking of arrow markings, for example.

Mr Beattie: I am not aware of anything along those lines. I know that the Commissioners of Northern Lighthouses have undertaken to mark the site, taking into account the marine usage in the area, which mainly involves lighter craft. I know that the developers are keen for yachting associations to be consulted when the sites are marked. The associations want their views to be taken into account so that the maximum possible warning to leisure craft is ensured. I am not aware of the detail of what is to happen in that respect. It will of course be up to the commissioners to decide what to do, as they are responsible for the area.

The Convener: We have one further final question.

Mr Mike Rumbles (West Aberdeenshire and Kincardine) (LD): I have a layman's question—I am of course a layman. There seems to be some controversy about the length of the blades in relation to the safety of yachts, as yachts could get tangled up in the blades. Is there a system whereby a boom could be put around the wind farm to avoid pleasure craft drifting into the turbines in the first place?

Mr Beattie: Not as far as I am aware, but I am not an expert in that area.

Mr Rumbles: I might take up the question with some of the other witnesses.

The Convener: I am sorry, Mr Beattie, but I have a third final question. Much of the evidence and material before the committee is fairly complex, which makes it hard to cut to the chase. Can you give us a view of the critical actions that the promoters could take to avoid collisions altogether?

Mr Beattie: The two key elements to avoiding collisions are those that the promoters plan to take: marking the site to give maximum possible warning to vessels in the area, which as I said will mainly be recreational craft; and information distribution. I know that the promoters are keen to take on board the views of local clubs. The promoters want to ensure the maximum distribution of information so that everyone is notified about and aware of the site and can navigate accordingly.

The Convener: I am sorry, but we now have a fourth final question.

Colin Campbell (West of Scotland) (SNP): Mr Beattie, are you implying that the existence of an exclusion zone would not necessarily diminish the possibility of collision?

Mr Beattie: In terms of vessel navigation, the point of the exclusion zones is that they provide a buffer, which means that vessels should never pass closer than a certain proximity. If the buffer is not there, there is a chance that they might pass closer to the turbines and, if they get into difficulty, there is that much less time for avoidance.

The Convener: I hesitate to ask whether we are all finished. Thank you, Mr Beattie.

Our next witness is Mr John Gallagher, who is the technical director of electromagnetics at QinetiQ—if I have pronounced that right; it is a challenging word, Mr Gallagher. He will give us evidence on the possible impact on global positioning systems and radar.

MR JOHN GALLAGHER *made a solemn affirmation.*

Mr Trinick: Mr Gallagher, you delivered your precognition to the hearing and your details and qualifications are given within it, together with a glossary of a fairly technical subject. We do not need to refer to your precognition at all; we need to refer to the additional technical information that the committee requested. That took some time to complete—not unnaturally, given the nature of the subject—and so it has only now been distributed to the committee. Convener, my witness is available all day. Obviously, we do not expect the committee suddenly to read the document now and to take it all in, but if, perhaps over the lunch break, any points arise, Mr Gallagher will be here for recall.

The Convener: That is much appreciated. The report is rather late, so that will give members a chance to digest it.

Mr Trinick: Because the subject is technical, Mr Gallagher, I want to take you briefly through your conclusions on the various areas, so that they are clear for the committee. Paragraphs 13 to 20 of your precognition cover radar. I believe that you address three issues, which we will take in turn quickly. The first is—I raise this question as a layman—whether radar systems on vessels will be able to detect the wind turbines. What is your view on that?

Mr John Gallagher (QinetiQ): Yes, they will. Quite clearly, the very large signature of the turbines will be seen by all the radars in the area.

Mr Trinick: Secondly, will a vessel-mounted radar, especially a search-and-rescue radar, be able to detect a vessel that is inside or on the edge of the wind farm, especially if that vessel is the subject of a search-and-rescue mission? To assist us with that, can you go to the technical report that has just been delivered? I believe that a further colour photocopy will be available at lunch time and we will do our best for this afternoon, but for the moment can you go to figure 1? Those who

are lucky enough to have a colour copy will see glorious pink and all sorts. With the permission of the convener and Mr Mackenzie, I will lead you through this fairly quickly. On the left column of figure 1, the figures are in metres. Is that right?

Mr Gallagher: Yes.

Mr Trinick: The figure at point 0 is the wind turbine.

Mr Gallagher: Yes.

Mr Trinick: We can imagine a search radar to the left of that figure 0. It is pointing from left to right, past the wind turbine, so the figures 0, 5, 10, and so on, are the metres to each side of that wind turbine.

Mr Gallagher: That is correct.

Mr Trinick: The bottom row is fairly obvious. It shows metres down range from the wind turbine.

Mr Gallagher: That is correct.

Mr Trinick: In the propagation loss column, to the right of the figure, we have a zero, but that is not at the top. Above that there is a 5, which is gain rather than loss. That is radar gain as a result of the wind turbine.

Mr Gallagher: That is correct.

Mr Trinick: Below that, we have a loss of efficiency of radar. At about -10, as I understand it, you start to experience a shadow effect.

Mr Gallagher: That is correct. A value of -10dB would be a shadow.

Mr Trinick: Thank you. When you get down to the blue area, at about -35 or thereabouts, there would be serious problems with the radar being efficient enough to get past the turbine.

Mr Gallagher: That is correct.

Mr Trinick: At -50, you are in deep shadow.

Mr Gallagher: That is correct.

11:00

Mr Trinick: If we look at the width of the effect, in terms of the values that we have just been through, how wide is the zone 400m down range, shown as the area of yellow in figure 1?

Mr Gallagher: The shadow zone is approximately 7m wide.

Mr Trinick: Figure 1 continues, on the next page, into figure 2, because it goes further down range. The same image is projected to 10,000m, and we can see how the effect tails off.

Mr Gallagher: Yes. It is diminishing quite significantly.

Mr Trinick: Does the effect, when experienced to a degree that would have a significant effect on radar reception, at any stage exceed 7m in width?

Mr Gallagher: Sorry. Could you repeat that?

Mr Trinick: I put the question appallingly badly. I shall try again. Does the width of the effect as shown on figures 1 and 2—and by "the effect", I mean an effect that has the potential to influence radar reception—ever extend beyond 7m?

Mr Gallagher: Essentially, no. The 7m width is about the widest area for the single turbine.

Mr Trinick: So, take us now to the practical consequences of that, in terms of the size of vessels and the effects on those vessels.

Mr Gallagher: For larger vessels that are more than 7m, it is unlikely that all of the vessel will be in the shadow area, so some signature return will come back to the radar for those elements of the vessel that are not in the shadow area. The larger vessels above 7m are likely to be detected behind the wind turbine.

For a smaller vessel of 7m or less, there is a possibility that the vessel will exist in the shadow region, so the signature of the vessel, which will also be reduced because of its physical size, will make it difficult to detect. If the vessel is moving across the shadow, it will obviously come out of the shadow region and will then be detectable. For a very small cross-range extent, there is only a small area in which detectability for those small vessels might be a problem.

If the vessel is stationary in the shadow region, the radar on the vessel that is looking for vessels behind the wind farm or behind the tower—the searching vessel itself—will be moving. The radar shadow that is created by the wind turbine will be spatially moving within the wind farm. That means that, as the shadow moves, it will move out from the location where the stationary vessel is. In that case, the vessel becomes available for detection. There is a finite possibility that a stationary small vessel in the shadow will not be detected at close range, within 1km or 2km of the wind turbine.

Mr Trinick: I understand. You envisage two situations in which the turbine is always the fixed point. In scenario 1, the other fixed point is the vessel behind the turbine on the other side from the radar. Given that the search vessel will not be stationary, but will be moving in some fashion, it will regain contact with the vessel when it emerges on the other side of the turbine.

Mr Gallagher: That is correct.

Mr Trinick: In the other scenario, the vessel is hidden by the turbine and in the shadow, but because it is moving, it will emerge from the shadow.

Mr Gallagher: That is correct.

Mr Trinick: Okay. Thank you. I refer you to figure 5 on page 11. Although the topic is the

same, the difference is that you have portrayed two turbines in a line. What is envisaged in figure 5 is a scenario in which the radar is in line with the two turbines and the vessel, which is the fourth player in this scenario, is behind the second turbine.

Mr Gallagher: That is correct.

Mr Trinick: In a sense, we are talking about a line of four players. Will you please take us through the consequences that are set out in figure 5?

Mr Gallagher: Figure 5 is an extension of the single turbine case. We have extended the shadow of the first turbine beyond the second turbine. Figure 5 looks at the effect of the shadowing of one turbine on another and the detectability of a target that is in the second shadow. The dark vertical lines between the two turbines show clearly the interference between the two turbines and the detectability of targets in the area.

Beyond that and to the right of the zero down-range line, the shadow continues in a very similar fashion. It is as if it were made by a single turbine, as there is no significant variation in the width of the shadow over that which is made by a single turbine. The conclusions that I draw in figure 5 are broadly the same as those that I drew in respect of a single turbine. The shadowing of one turbine on another turbine can be considered to be similar to that of a single turbine.

Mr Trinick: I said earlier that there were three radar issues. The third issue, which you consider in paragraphs 18 and 19 of your precognition, is what you call "radar sidelobe reflections". The layman may ask what conclusions you reached in that respect. What conclusions did you reach about the effect of sidelobe reflections?

Mr Gallagher: A comment was made about the false position of targets as a result of multiple sidelobe scattering of energy. I considered typical marine radars and the Raytheon Pathfinder radar in particular. I looked at the antenna, radar performance, and sidelobe characteristics. Sidelobe is the energy that emanates from lobes that are a lower level to the main beam energy direction. The energy in the sidelobes comes in at 1,000 times below the energy that comes in on the main beam.

Given that we are talking about a two-way path, the energy is reduced by 1,000 times looking out and 1,000 times coming back. If the power intensity that comes in on the sidelobe level is a million times less, that is a significant reduction and the likelihood of the level of signal coming in on the sidelobe and giving a false position of the target is almost zero—the signature level is just so low that the radar will not pick up a target from its sidelobes. False positioning will not occur.

Mr Trinick: You cover very high frequency communication in paragraphs 21 to 23 of your precognition. In paragraph 23 you say:

"Taking a conservative approach, we estimate this minimum separation distance"—

which is that in which there could be a potential effect—

"as no more than 150 metres. Additional calculations are being performed to verify this."

We find those in the technical report. I refer you to figure 7 on page 15 of that report. Again, we can work pictorially rather than with text. Am I right that the left column has distances in metres for either side of a turbine, which is at the zero position, and that the horizontal line has down-range distances in metres?

Mr Gallagher: That is right.

Mr Trinick: Thank you. The right column has figures for propagation loss that are on the same basis as those for radar, but which have, I understand, a rather different calibration. For example, a loss of -2.5dB sq m is, I understand, roughly a one-third loss. What is the practical effect of such a loss on the receipt of VHF transmissions?

Mr Gallagher: A 30 per cent loss is probably insignificant with respect to a transceiver's ability to operate effectively.

Mr Trinick: When we come to -5—I am sorry to push you through this, but we must keep to the time scale. I think that -5dB sq m is roughly a 70 per cent loss of effectiveness.

Mr Gallagher: That is correct.

Mr Trinick: Again, what is the practical consequence of that?

Mr Gallagher: A properly configured transceiver might be considered to be working reasonably well if it had a figure of -5dB sq m. However, if a transceiver were not fully configured, there might be doubt about its performance or its ability to communicate effectively with transceivers that are starting to move into the -5dB sq m level of signal loss.

Mr Trinick: At what point would there be a 100 per cent loss of a receiver's ability to understand a signal?

Mr Gallagher: When someone comes within a range of about 10m from a turbine, there is about a 90 per cent loss of signal. There might be significant problems in communicating if a transceiver were 10m from a turbine and in the turbine's shadow, when it points at a substation receiver.

Mr Trinick: Okay. I think that you reach a conclusion on the issue in paragraph 23 of your technical note. Your earlier conclusion in your

precognition gave a conservative estimation of 150m, but paragraph 23 of your technical note refines that to 100m.

Mr Gallagher: That is correct.

Mr Trinick: Can you tell the committee why the distance of 100m is a threshold?

Mr Gallagher: It is a threshold because a transceiver's configuration might start to have problems within a range of 100m. Not all transceivers will have problems. It depends how they are configured. Therefore, the estimate of 100m is a fairly conservative one. In many cases, the threshold distance will be shorter.

Mr Trinick: Yes, but do you envisage any problems in the receipt of a VHF transmission beyond 100m?

Mr Gallagher: That is correct.

Mr Trinick: No—I asked a question. Do you perceive—from your studies—that there will be problems in the receipt of a VHF transmission beyond a downstream distance of 100m—if I can put it that way?

Mr Gallagher: I am sorry. I do not envisage problems beyond 100m.

Mr Trinick: Okay—thank you. I think that figure 9 of the technical report does the same for VHF as figure 6 did for radar, so we need not go into detail on figure 9, unless the committee wants to.

Your precognition deals finally with the issue of the global positioning system. However, I think that paragraph 38 says for the moment all that needs to be said about GPS. I have no further questions.

Mr Mackenzie: I have no questions at this stage for Mr Gallagher. However, I have just received a copy of his technical report, so I wonder whether I can have the opportunity of reading it over lunch and perhaps indicating at 2 o'clock whether I have any questions.

The Convener: That is perfectly acceptable. Do committee members have any questions?

Mr McGrigor: The final sentence of paragraph 34 of Mr Gallagher's precognition says:

"These conclusions are based on our experience of analysing the electromagnetic impact of other offshore wind farms."

Paragraph 35 goes on to say:

"Wind turbines of the size to be installed at Robin Rigg have very large values of RCS".

On which other wind farms did you base your conclusions, Mr Gallagher? Do those farms have turbines as big as the ones that we are talking about at Robin rigg?

Mr Gallagher: We have looked at the North Hoyle wind farm and analysed the impact of the size of the turbines on marine radar there. We have considered Kentish flats in the Thames. Again, we analysed that wind farm in respect of the size of the turbines. We assume that the turbines on one offshore wind farm will end up a similar size to those on another. Given the assumptions about the size of the turbines, the results will be fairly consistent from one wind farm to another.

11:15

Mr McGrigor: Is Robin rigg wind farm going to have higher turbines than the ones that you have already considered?

Mr Gallagher: The results of the analysis that has been done show that the shadowing effects will not greatly depend on the height or size of the turbines.

Mr McGrigor: Could you answer my question? Are the turbines you have considered and on which you have based your conclusions smaller than the ones that will be used at Robin rigg?

Mr Gallagher: No. I am saying that the turbines are practically the same size from one wind farm to another. The results will be very similar. The layouts might be different but the turbines are broadly the same size.

Mr McGrigor: What does "azimuthal" mean?

Mr Gallagher: It is a measure of the angular distance on the horizontal plane. If 0 deg is straight ahead, a clockwise move of 50 deg would move you to your right by 50 deg and would leave you looking in a particular direction.

Mr John Home Robertson (East Lothian) (Lab): Figure 1 in your technical report shows the shadow cast by a single turbine tower. Figure 5 shows the shadow cast by two turbine towers where one is directly behind the other. We are talking about a lot of turbine towers and they might not all be in alignment with one another. If a rescue operation was using radar to look for something, the cumulative effect of all the towers that are supposed to be sited at Robin rigg could be a forest of 5m shadows, which could make it extremely difficult to locate something among, behind or in front of the turbines.

Mr Gallagher: The shadow is about 7m wide and the turbines are at a minimum distance of 450m apart. So the 7m shadows will be narrow strips relative to the spacing of the turbines.

Mr Home Robertson: The individual shadows might be narrow, but there will be quite a clutter of them and under certain circumstances that will add up to quite a complicated picture.

Mr Gallagher: It could. However, if you take an example of five strips of 7m shadows, that makes 35m, which is much less than the 450m that there will be between the turbines.

Colin Campbell: I would like a little clarification on GPS. Paragraph 27 of your precognition, on coarse acquisition, says that there is an error of about 300m in range. Then paragraph 29 says that the precise code gives an error of about 30m in range. Are we talking about a 30m error in civilian GPS?

Mr Gallagher: Possibly. That is the maximum error that you will get from the timing and the bit rate—the rate at which data are coming from the satellite. The coarse acquisition data-flow rate is 1 megabit per second, which translates with relation to the speed of light to 300m to have a bit travel in the time that it exists. Therefore, there is an error on the data-flow rate. When you move on to the precise code, you have 10 megabits per second, which reduces that 300m to 30m. The difference is related to the data-flow rate.

Colin Campbell: Thank you. I just had the impression that GPS could be used to land an object very precisely on another to within no error, and I wondered whether there was some difference between civilian GPS and military GPS.

John Gallagher: No, there is still an error in military GPS.

Mr Home Robertson: Paragraph 20 of your main precognition notes:

"For small vessels it is possible that they will be in deep shadow and not detectable."

Can the promoters do anything to improve that situation?

John Gallagher: That depends. The argument was that the vessel might be moving in the shadow, in which case it would not remain undetected. If it remains stationary, the search vessel, if moving, will move the shadow away from the vehicle that is sitting stationary. Therefore, the fact that there is movement—either of the vessel within the wind farm, or of the search vessel with its radar outside the wind farm—will start to move the shadow away from the vessel so that the vessel is likely to become detectable. It is only in the very specific instance where both vessels are stationary that the vessel within the wind farm could be undetectable—that is an extreme situation, which is unlikely to be of any relevance.

Mr Home Robertson: I admire your optimism.

The Convener: Much of this evidence is fairly complex, Mr Gallagher. I will attempt to summarise my understanding of it so far, and you can let me know if that is wrong. With regard to radio frequency, you were saying that it may be impaired in the farm, but not completely obscured provided that the vessel is over 7m.

Mr Gallagher: That is correct.

The Convener: As regards radar, you were saying that it will be affected, but that as long as the vessel is moving, it will still be able to identify other vessels.

Mr Gallagher: Yes.

The Convener: Also, VHF communication will operate until the distance between the vessels becomes less than 100m, in which case an intervening turbine could block it.

Mr Gallagher: That is correct.

The Convener: The main GPS would not be affected, in your opinion.

Mr Gallagher: That is correct.

The Convener: The promoter is suggesting an active management system. How do you think that that would be affected by the inability to detect smaller vessels?

Mr Gallagher: That depends on the concept to be put forward for it. If you have an active management system, you might have a radar site that gives you better visibility. You may have two points from which you look across the wind farm; some areas may be shadowed by one observation point but not by the other. Therefore you might be able to see all of the vessels clearly because you will have two sets of data. Some of those data may not show a result but the others would. Those possibilities exist.

The Convener: In summary, is it possible that the active management system could alleviate some of the issues that we discussed?

Mr Gallagher: It could certainly assist.

The Convener: Thank you very much.

Our next witness is Mr Dan Badger, who is project manager with Offshore Energy Resource Ltd. He will give evidence on the minimum clearance for the turbine motor blades. Good morning, Mr Badger.

MR DAN BADGER *took the oath.*

Mr Trinick: Mr Badger, you have placed three documents before the committee as evidence. The first is your main precognition, the second is a supplementary precognition that deals with water levels and revised calculations of blade collision risk, and the third draws on the evidence of Mr Beattie and Mr Gallagher. I requested that you give evidence third rather than first so that you could draw some qualitative conclusions that are based on their technical evidence.

I do not want you to read the evidence, but I have some quick supplementary questions for you.

Paragraph 6 of the main precognition states:

"On the basis of the quantitative collision risk assessment described below, the Promoters have come to the view that a proper balance between cost and risk is achieved with a minimum distance of 18.0 metres."

Was that view taken with or without any active management system?

Mr Dan Badger (Offshore Energy Resource Ltd): That view was taken without the benefit of the active management system and was based on the risk assessment of a collision at the 18m height, assuming that there is no mitigation from the active management system.

Mr Trinick: Could you keep your voice raised, please?

Paragraph 9.1 states:

"The WTGs are installed such that the distance between a blade in the 6 o'clock position and Mean High Water Spring is 18.0 metres."

In paragraph 11.1 you refer to

"the combined probability of a collision for all vessels".

In the third line of that paragraph, you refer to vessels under 16m—which means vessels with a mast height of less than 16m. Looking at table 1, we see that the risk of collision starts at a level of 16m. If you are allowing an 18m clearance, will you confirm for everybody's benefit why the risk starts at 16m?

Mr Badger: According to our analysis of water heights on the site, the class of vessels that is at risk of any type of collision at all is that whose mast height exceeds 16m with a clearance at mean high-water springs of 18m. That is because our analysis of water levels on the site leads us to believe that the highest water level that should statistically be taken into account for this analysis is 2m above mean high-water springs. That is the differential of a 16m mast, with 2m of allowance for the increase due to a combination of extreme waves and extreme tidal conditions.

Mr Trinick: The fourth line of paragraph 9.5 of your main precognition uses the words:

"assuming also that a vessel sails 10 hours per day during March through September, and 8 hours per day during the remaining months".

For the avoidance of doubt—I know that I am probably the only stupid person in the room—do you mean sailing in the Solway area?

Mr Badger: Yes.

Mr Trinick: All that sailing time is in the Solway area.

Am I right that a correction has to be made to footnote 2, which relates to paragraph 11.2?

Mr Badger: That is correct. I apologise to the committee for some typographical errors in footnote 2. The reference to 5,000 years should be to 3,400 years. The last number in footnote 2, which is 0.990, should be 0.900. I apologise for those typographical errors, but the conclusions stand as calculated.

11:30

The Convener: What is a difference of 1,600 years between friends?

Mr Trinick: I think that there is a consequential amendment to footnote 3 on the next page.

Mr Badger: I am sorry; that is correct. The same correction applies to footnote 3 on the next page. The last number, which is 0.990, should be 0.900.

Mr Trinick: I turn to paragraph 13 of your supplementary precognition, which deals with water levels and revised calculations of blade risk. So that we can relate that to your main precognition, I can lead you to some extent. In your main precognition, you came to a figure of 3,400 years to represent the time that it would take for the probability that there will be one collision to exceed 10 per cent. Let us be clear about that. In paragraph 13 of your supplementary precognition, you have taken account of the international rating club fleet—the data on which were produced by Mr Eardley—which is a larger fleet than that of the Solway Yacht Club, the information on which was provided by Mr Copland. Am I right so far?

Mr Badger: Not quite. The difference between the first calculation—which yields 3,400 years—and the second calculation is not the size of the fleet but the size distribution of the masts in the fleet. In the second calculation, I have assumed the same number of vessels, but I assumed that the mast sizes are somewhat higher and are characteristic of the mast sizes of the IRC fleet as a whole.

Mr Trinick: That means 12.7 per cent as opposed to 5 per cent—the figures are in paragraph 13 of the supplementary precognition. The resulting calculation of how long it would take for the chance of one collision to exceed 10 per cent is 2,025 years rather than 3,400 years.

I believe that you have had contact with the Maritime and Coastguard Agency about the proposed active management system. Has that resulted in a letter from the MCA?

Mr Badger: Yes. I have a letter from the MCA, which says that, with a few modifications that I would be happy to describe, the MCA believes that the proposals that we have made are a

feasible and effective way in which to mitigate further the risk of collisions.

Mr Trinick: That letter is being distributed. I apologise to the convener; the letter arrived recently, so we brought it to the hearing. As the letter is a new arrival and is fairly brief, I ask Mr Badger to read it out, once I have introduced it. The letter is addressed to Mr Badger and is on the headed notepaper of the Maritime and Coastguard Agency. The letter is from the agency's Southampton office, is dated 17 February and was signed by the assistant chief coastguard and head of search and rescue of the MCA. It starts with "Dear Mr Badger". Would you please read out the letter, ignoring the heading?

Mr Badger: The letter reads:

"On behalf of the Maritime & Coastguard Agency (MCA), I can confirm that the MCA has reviewed the attached document"—

which was a document that I sent originally.

Mr Trinick: What was the attached document?

Mr Badger: What I originally sent to the MCA was the proposed emergency management system that we sent to the Royal Yachting Association when describing our proposal.

Mr Trinick: Is that recorded in your evidence?

Mr Badger: Yes.

Mr Trinick: Is the attached document that is referred to in the letter the document that is attached to the letter?

Mr Badger: That is correct.

Mr Trinick: Please continue reading.

Mr Badger: The letter continues:

"The requirements and procedures described in this document represent a feasible and effective approach to mitigating the potential risks to mariners when the subject of, or involved in, a search and rescue, counter pollution or salvage operation.

The MCA will co-operate fully with the Wind Farm operators in carrying out the procedures described in the document."

Mr Trinick: The procedures that are described in the attached document are based on those that are set out in the document that you sent to the MCA, with some variations that are suggested by the MCA.

Mr Badger: That is correct.

Mr Trinick: We must give members a reasonable chance to read the document. Can you confirm that you accept the amendments that are proposed by the MCA?

Mr Badger: Yes.

Mr Trinick: Thank you very much.

Mr Home Robertson: Paragraph 1 of the section that is headed "Design Requirements" includes a series of blanks. The number of metres' clearance is not specified.

Mr Badger: That is correct.

The Convener: We will deal with that point after members have had a chance to digest the letter.

Mr Mackenzie: Before we consider your precognitions, I have a question about the bill. The bill refers to a certain level of clearance above the level of high water, which is defined as

"the level of mean high-water springs".

What is your understanding of that term?

Mr Badger: The term means the average height of water at the spring high tide, which takes place on a particular date in the spring each year.

Mr Mackenzie: So you understand "springs" as meaning once every year in the spring? Is the correct meaning of the term not that there are spring tides approximately every fortnight?

Mr Badger: It is the annual average high tide.

Mr Mackenzie: Other witnesses might be more qualified to deal with this point. I understand that spring tides occur approximately once every fortnight. We are not talking about an annual event. "Spring tides" is simply a name that is given to tides that occur approximately once every fortnight. Is that correct?

Mr Badger: I think so.

Mr Mackenzie: So when you refer to "mean high-water springs" you do not mean a tide that occurs once a year at spring time, but tides that occur on an approximately fortnightly basis. Is that correct?

Mr Badger: I think so.

Mr Mackenzie: Perhaps Mr Eardley can expand on that.

I refer you to your main precognition. Paragraph 4 states that the bill as introduced provides that

"there shall be a minimum distance of 25 metres between the lowest point of the rotating blades and the level of high water",

by which "mean high-water springs" are meant. Why was that distance chosen?

Mr Badger: That distance was chosen because when we introduced the bill we had in mind a reference design for the wind turbines that was based on the assumption of an 80m hub height. By the way, that figure refers to mean sea level, not mean high-water springs. The hub height was to be 80m and the rotor diameter was to be 130m—sorry, I am getting confused. The hub height was to be 80m and the rotor diameter was

to be 100m. Therefore, 80m minus one half of 100m would leave clearance of 30m against mean sea level. We left an additional 5m to account for mean high-water springs plus a margin of safety. Thus, we chose 25m on the basis of a notional wind turbine design. However, at that time we did not understand the cost implications of building a tower that high.

Mr Mackenzie: What consideration was given at that stage to what would be a safe distance for mast height clearance?

Mr Badger: No particular consideration whatever was given. That issue was not recognised at all until it was raised by the RYA.

Mr Mackenzie: Paragraph 5 of your precognition states:

"Since proposing the Bill, the Promoters have received bids",

after which you go on to state that the distance should be 18m. Am I right in thinking that, a few weeks ago, the promoters sought to reduce the clearance distance to 22m?

Mr Badger: We did that a few months ago, not a few weeks ago, and we did so before any bids had come in. The reason why we did so was our discovery that one of the manufacturers was proposing a 104m rotor diameter instead of the 100m rotor diameter that we originally envisaged. To allow for that possibility, we notified the committee several months ago that we planned to reduce the distance from 25m to 22m.

Mr Mackenzie: At that stage, what consideration did you give to what would be a safe clearance distance for mast heights?

Mr Badger: By that time, we were aware that the RYA was concerned about blade clearance. We met the RYA and articulated our view that we did not share that concern and that we considered that the risk of collision that the RYA described was so unlikely that we were not concerned about the distance of 25m nor about 22m.

Mr Mackenzie: The last sentence of paragraph 5 of your precognition states:

"Since Offshore Wind is a new and expensive technology, whose economics are such as to require financial support from the DTI, significant extra costs must be rigorously justified."

That paragraph mentions the Department of Trade and Industry, but am I right in thinking that there is no question that the DTI requires a minimum clearance of 18m? Is it correct to say that that figure does not come from the DTI?

Mr Badger: That is correct.

Mr Mackenzie: Let me ask you this question bluntly. Is it your position simply that the development will be commercially unviable if clearance is greater than 18m?

Mr Badger: We do not know. We are saying that the project will be commercially unviable if we do not scrutinise every cost that is put forward. Every cost must be justified on the basis of the benefit to be gained or the risk to be avoided.

Mr Mackenzie: Thank you.

Paragraph 9.3 of your main precognition gives the basis for the risk assessment:

"The assumed water level throughout the wind farm site is 2.1 metres above Mean High Water Springs".

Am I right in thinking that if clearance of 18m is included in the bill, we can take 2.1m off that to allow for adverse sea conditions, which brings us down to a mast of about 16m? Is that correct?

Mr Badger: Yes, that is correct.

Mr Mackenzie: This morning, I referred Mr Beattie to his previous document, in which he allowed 7m clearance for extreme weather conditions. Can you explain why he allowed for 7m, and you allow for 2.1m?

11:45

Mr Badger: Yes. Mr Beattie's 7m was a reference to a calculation that was reported in our environmental statement. That calculation was a simple addition of the highest level of high tide that the analysis forecast in 50 years, plus the highest wave that the analysis forecast in 50 years. I think that one was 4m and the other was 3m, and they were simply added together. That analysis did not take into account the joint probability of those two events occurring together, whereas the analysis that I present in my supplementary precognition is based on an analysis of the combination of high tides and highest waves that have been observed over a 109-month observation period.

Mr Mackenzie: On the question of deducting 2.1m from the clearance to allow for adverse weather conditions, would you agree that there should also be some allowance—of the order of 0.5m to 1m—for equipment at the top of a boat's mast, for example aerials and essential navigational equipment?

Mr Badger: At this point, I have to ask whether a collision between a blade and an aerial would necessarily lead to the dramatic consequences that the RYA is concerned about. I can understand how a collision with a mast would potentially lead to dismasting, but no one had advised me that a collision with an aerial—which, to me, is rather flexible—would lead to dismasting of a vessel.

Mr Mackenzie: No, but if there is important navigational equipment at the top of a mast, I presume that you would agree that it is important that that equipment is not knocked off.

Mr Badger: Yes, that is important.

Mr Mackenzie: Paragraph 9.8 of your precognition states that one of the assumptions that you have made in carrying out your risk assessment is that

"The mast-height distribution … is the same as the distribution of mast heights for the 39 offshore sailing cruisers berthed at the Solway Yacht Club".

In short, would it be fair to say that the risk assessment is essentially a risk assessment of those 39 boats?

Mr Badger: Not quite. It would be fair to say that the physical characteristics of the vessel population that was used for the assessment is based on those 39 boats, but the number of vessels that it was assumed would be navigating within the area is not those 39 boats; rather, it is the number of vessels that the Solway Yacht Club estimated for us would be found within the area on any given weekend or week day at any given time of year.

Mr Mackenzie: What allowance in the risk assessment has been made for other types of vessel with higher masts using the Solway firth in the operational lifespan of the development—the next 20 or 25 years, for example?

Mr Badger: Paragraph 11.3 of my precognition reports the result of asking how many vessels with masts in the above-16m class would have to be navigating in the area in order for there to be a 10 per cent chance over 20 years of a collision. The answer is 170 vessels in each mast-height class. In that sense, we have taken into account the possibility that larger vessels will, over time, be sailing in the area. We have found, however, that for the risk to begin to become significant, there would have to be an extremely large number of large vessels.

Mr Mackenzie: In paragraph 11.3, you say:

"There would have to be about 170 cruisers in each of the three largest mast height classes in order for the probability of one collision in 20 years to exceed 10%."

What are the mast-height classes? Are they all over 16m?

Mr Badger: There are three mast-height classes: 16m to 18m; 18m to 20m; and above 20m. That means that there would have to be 510 cruisers in total in the area.

Mr Mackenzie: Is it your opinion that, if there were 510 cruisers with masts higher than 16m criss-crossing the Solway firth in the next 20 years, there would be a 10 per cent probability of there being a collision?

Mr Badger *indicated agreement.*

Mr Mackenzie: Does that not seem to be a bit odd? Am I right in thinking that you have assumed, in your calculations, that the skippers randomly criss-cross the area?

Mr Badger *indicated agreement.*

Mr Mackenzie: Are you saying that, allowing for that random navigation, the risk of a collision in 20 years is 10 per cent?

Mr Badger *indicated agreement.*

Mr Mackenzie: I want to explore in a little more detail some of the figures in your supplementary precognition. Paragraph 4 speaks about wave-height data being measured at a location about 30km from the wind farm site. Where was that location?

Mr Badger The location was a point 30km to the south-west of the wind farm site, further out in the Solway firth. It is the location of a water-height measurement station that is operated by a Government agency—I cannot remember the name of the agency, but Jerry Eardley could probably tell you. The station records long-term data on wave heights.

Mr Mackenzie: Paragraph 4 also talks about

"a more limited period of wave-height measurements on the site".

I am not clear about how many measurements were taken on the site and over how long a period.

Mr Badger: The wave heights were measured continuously on the site for 18 months.

Mr Mackenzie: The last sentence of paragraph 7 states:

"Only 0.83% of these calculated water levels exceeded 6.0 metres."

Does that suggest that there might be occasions—albeit rare—when water levels would exceed 6m?

Mr Badger: Yes.

Mr Mackenzie: In paragraph 2 of your supplementary precognition, you state that one of the assumptions is

"that the water level on the site is never … higher than 6.0 metres".

Is your use of the word "never" putting things a bit strongly?

Mr Badger: It is a bit strong to assume that the water level is never higher than 6m, but it would be a bit weak to assume that it is never lower than 6m.

Mr Mackenzie: I just want to be clear about the matter, because it might cause confusion. Does the figure

"6.0 metres above mean sea level"

equate essentially to 2.1m above mean high-water springs?

Mr Badger: The figure for mean high-water springs is 3.7m. That means that the figure in question is 2.3m above mean high-water springs.

Mr Mackenzie: If one allows for the proposers' request for 18m clearance and then subtracts 2m for adverse sea conditions, waves and tide surge, that brings the figure down to 16m. If, for present purposes, we assume that there is some allowance—say between 0.5m and 1m—for what is at the top of a mast, we are left with about 15m or 16m, or in that neck of the woods. That will put boats at risk.

At this point, I ask you to consider the graph that Mr Eardley has annexed to the end of his precognition. We have just identified that boats with masts of 15m to 16m might be at risk of colliding with turbines in adverse sea conditions. The graph shows a column of boats in the IRC fleet whose air draught is 14m to 16m, so it appears that the air draught of a significant number of boats in the fleet would put them at risk of collision.

Mr Badger: I am looking at the graph to which you refer, but I am not sure what the question is. Will you restate it?

Mr Mackenzie: Indeed. We have already identified that boats with mast heights between 15m and 16m would be at risk of colliding with a turbine blade in adverse sea conditions. The graph in Mr Eardley's precognition contains a column for boats that have masts of between 14m and 16m in height. The graph shows that a considerable number of boats—604, I think—have masts of that height.

Mr Badger: I think that I am having trouble with your premise. I have not found that vessels whose masts are less than 16m in height would be at risk.

Mr Mackenzie: Other witnesses can speak on that matter. However, if allowance were made for aerials and so on at the top of masts, that might bring down to between 15m and 16m the mast height of vessels that would be at risk of collision. Briefly, my point is simply that the graph shows that 604 boats in the IRC fleet appear to come within the danger area of 14m to 16m mast heights.

Mr Badger: The 16m figure is tricky, because the next column shows that 157 boats are in the 16m to 18m mast height group.

Mr Mackenzie: Indeed.

Mr Badger: The way I read the graph, 16m is a cut-off point. Below that point is a very large number of vessels and above it is a very small number of vessels. That is more or less the basis on which we selected the clearance figure of 18m.

Mr Mackenzie: That does not perhaps allow much room for error.

Mr Badger: That is why we have proposed additional mitigation.

12:00

Mr Mackenzie: Let us look at the emergency management system. Have you chosen 18m as the minimum clearance, allowing 2m for adverse conditions—which brings us to 16m—on the grounds of safety or costs?

Mr Badger: As I say in paragraph 5 or 6 of my precognition, we have made a balancing judgment. The cost increases rapidly, and the number of vessels that are potentially involved decreases rapidly, as the clearance rises above 18m.

Mr Mackenzie: Would you reduce the clearance to less than 18m?

Mr Badger: We are not proposing to reduce it to less than 18m. I would like to do so, but we are not proposing that.

Mr Mackenzie: Do you think that it would be safe to reduce it to less than 18m?

Mr Badger: Yes.

Mr Mackenzie: How much lower do you think it would be safe to go?

Mr Badger: With the active management system, it would be safe to go as low as one wished.

Mr Mackenzie: In theory, would that be perhaps 1m?

Let us turn to the active management system, which I think I can deal with relatively briefly. A concern of the Royal Yachting Association is that although the system may be introduced, it may cease operation at some point in the next 20 to 25 years. Is it your position that the system should be binding on present and future operators?

Mr Badger: Yes.

Mr Mackenzie: How do you envisage the system being made binding? Would that form part of the bill?

Mr Badger: That is going a bit beyond my area. There are several things that we are prepared to commit to doing, but I am not sure exactly where we should commit to doing them—whether in the bill, in undertakings given to third parties or in the licence conditions with the Scottish Executive. It is a complex area.

Mr Mackenzie: But, in short, for your purposes you are happy that the system is to be binding on present and future operators.

Mr Badger: Yes—all future operators of the wind farm.

Mr Mackenzie: There is no doubt that the system is a useful safeguard. In trying to follow how it would operate in practice, am I right in thinking that it is dependent initially on a distress call being made to the coastguard?

Mr Badger: That is correct.

Mr Mackenzie: The coastguard would then communicate with the central control centre.

Mr Badger: Correct.

Mr Mackenzie: Where will the central control centre be based?

Mr Badger: It will be based in Denmark. Both the shortlisted contractors have their central control operation in Denmark.

Mr Mackenzie: For the system to work effectively, it will be dependent on the central control room shutting down the right turbine or turbines.

Mr Badger: Correct.

Mr Mackenzie: So, essentially, the management system is dependent on a reliable and accurate communications system existing between the navigator in distress, the coastguard and the central control room.

Mr Badger *indicated agreement*.

Mr Mackenzie: Do you accept the fact that communications systems can sometimes fail?

Mr Badger: Sometimes they can.

Mr Mackenzie: One can understand the argument for a design solution for safety matters if communications systems were to fail.

Mr Badger *indicated agreement.*

Mr Mackenzie: To be fair to you, perhaps it is a matter of considering the risks and indulging in a balancing exercise.

The Convener: Will you indicate your responses verbally for the *Official Report,* Mr Badger?

Mr Badger: I am sorry. Yes.

Mr Mackenzie: Would it be correct to say that the ultimate decision as to which generator or generators should be shut down would rest with the coastguard?

Mr Badger: Yes.

Mr Mackenzie: If the coastguard requested that the whole farm should be shut down, would that request be complied with?

Mr Badger: Yes.

Mr Mackenzie: You suggested that you would be happy to rely entirely on the management system and that you would be happy with a 1m clearance if the system was in place. Does not that assume that there would be a working radio on board the vessel in distress and that persons on board that vessel would be competent to use the radio?

Mr Badger: Yes—the management system presumes that there would be a working radio.

Mr Mackenzie: That is part of the wider point that communications systems can fail. If they were to do so, it could be said that a design solution as a back-up could be beneficial.

Mr Badger: I am sorry, but I am not sure what you mean by "design solution".

Mr Mackenzie: In the design of the turbines, there should be a sufficiently high clearance between the blades and masts so that it would not matter if the management system failed as a result of a breakdown in communications.

Mr Badger: If the question is whether we think that a design solution is necessary to take into account the possibility of failure, I think that the answer is no.

Mr Mackenzie: Thank you.

Mr McGrigor: What is your contingency plan to assist vessels in distress within the wind farm if the navigation emergency management system fails?

Mr Badger: I presume that the NEMS would fail for the reason that has just been mentioned—that is, that radio communication had failed. If a vessel was in distress within the wind farm, we did not know about it and there was no way for it to communicate with us, there would be no way in which we could mitigate the risk.

Mr McGrigor: Is it therefore proposed that if any part of the NEMS were not functional, the turbines would automatically be stopped?

Mr Badger: If any part of the NEMS were not functional, the control room operator would not know that there was a problem and there would be no way to stop the turbines.

Mr McGrigor: What would happen if the blade were to hit something? Would that register somewhere? Would somebody know about it?

Mr Badger: I am exceeding my area of expertise, but my guess is that that event would be recorded or observable by the control room operator only if it resulted in the wind turbine shutting down. If the blade were to hit something but continued normal operation, I do not believe there would be any detection of that.

Mr Rumbles: Are you saying that, in your professional opinion, there would not be any need

to keep the blades 18m above the surface, because the management system would be sufficient to protect against any catastrophic incident? I have been listening to the questions that have been put to you, and it seems to me that there is some controversy over the number of masts that are less than 16m high. The information that we have before us on the air draught of the IRC fleet shows that the vast majority of those masts are less than 16m.

A question was put to you on the aerials at the top of the masts. Just to get things right in my own mind, my question is about your response to that question. Going back to first principles, your response was that we want to avoid a catastrophic incident. Is that correct?

Mr Badger: That is correct.

Mr Rumbles: So, although it is unfortunate and might be expensive, having the extra aerials is an irrelevance as far as you are concerned. Is that correct?

Mr Badger: That is correct.

Colin Campbell: When the system is shut down in an emergency, what would the clearance be above the level of the mean high-water springs at the various positions at which it might be shut down?

Mr Badger: If the turbines were shut down with one blade in the highest position, I believe that that would add an additional 25m to the 18m. I am looking at Rupert Steele, because he has done the trigonometry. I will check that, but it would more than double the 18m proposed clearance level.

Colin Campbell: Somebody spoke earlier about the possibility of supervising the site with fixed radar that might cover the whole area. Would that be built into your AMS system so that, before you were warned by the MCA, or by anybody else, you might find somebody in the area who should not be there and whose facilities for communication had perhaps broken down?

Mr Badger: When we first started thinking about the design features of the system, we asked some specialists whether it would be possible to develop a radar system that was capable of discriminating the size and mast height of vessels sufficiently to allow us to use that information as an element in the system. The answer was that, given the present state of the art, identifying mast height with any degree of accuracy is problematic. That inability to distinguish mast heights would cause us a problem if we were to implement a system that shut down the wind turbines whenever a vessel of any size approached any of the turbines. For example, there are fishing vessels that we know will be going across the site at all times. We have concluded for the time being that the active management system that we can accept is one that will require that a radio call be made by the vessel in distress.

Colin Campbell: As both you and the yachting people know, I speak as a complete amateur. Presumably, radar can distinguish to within a few metres the size of a vessel in or around the wind farm. Therefore, by some law of averages and expectation, the height of the mast might well relate to the size and volume of the vessel in, around or approaching the turbines, which might open up that area for you. I do not know—I am only asking.

Mr Badger: Again, I refer to the fishing vessels. We have not studied that issue in great detail, but we know that large, 10m to 20m fishing vessels will pass through the site. Making inferences from that about mast height might lead us to shut down under such circumstances, which we would not want to do all the time.

12:15

Mr Home Robertson: You have provided us with considerable detail about the study methodology, tides, waves, extreme waves and so on. Is there any indication that, over the many years to which the data relate, the weather has become more severe and waves have become bigger?

Mr Badger: To answer that question, we would have to examine the time series in a particular way. I did not do that. I examined all 109 months as a data set and ranked them according to water levels, from highest to lowest.

Mr Home Robertson: Many people are under the impression that global warming is taking place, that wind speeds are increasing and that weather is becoming more severe. I realise that that is partly conjecture, but it seems to be supported by some science. Under those circumstances, would not it be wise to build in an assumption that, during the life of the wind farm, waves may get higher and sea states may become more severe?

Mr Badger: It might be. That is why I underscored the other side of the assumption—that the water level is never lower than 6m above mean sea level. That is an extremely conservative approach. The member is right to say that it would be wise to be conservative about the highest level, but we feel that we have been conservative when setting the lowest level.

The Convener: How do you intend to reflect the emergency management system in the bill?

Mr Badger: Earlier, I said that I could not give a confident answer to that question at the moment. We will do that in the way that the committee believes is most appropriate. I do not know

whether we should do it by giving an undertaking to the RYA or by amending the bill, or whether the Scottish Executive should make it a licence condition.

The Convener: If the committee were minded to recommend that you reflect the emergency management system in the bill, would you be able to accommodate that?

Mr Badger: Yes.

The Convener: Thank you very much.

The last witness on behalf of the promoters is Mr Rupert Steele, who is head of regulation and Government affairs with TXU for Solway Offshore Ltd. This morning, he will give evidence on the need for and enforcement of exclusion zones, decommissioning, marking and notification.

MR RUPERT STEELE *took the oath.*

Mr Trinick: Mr Steele has submitted a precognition, but we do not need to read it or go into it in any detail. I have one or two supplementary questions—five to be precise.

First, I turn to paragraph 6.5 on page 7 of Mr Steele's precognition. In the context of fishing interests, he makes mention of a compensation fund, which he says will be dispersed

"against proof of loss by a small committee representing fishing and local interests and the project."

Will you amplify that statement, Mr Steele? How do you envisage that the committee will be constituted?

Mr Rupert Steele (TXU): The ports that could be affected that we have not dealt with in our arrangements with the Solway Shell-Fishermen's Association are Maryport and possibly Annan. We envisage that the committee will consist of representatives of the development and of the fishing communities in Maryport and Annan and possibly also an independent expert.

Mr Trinick: A representative of the project?

Mr Steele: Yes. I mentioned that first.

Mr Trinick: I am sorry. I will move on to paragraph 7.4, which is on the same page. There has been some to-ing and fro-ing in e-mails and otherwise on decommissioning. I will rehearse where we appear to be at present. It seems that the Scottish Executive has issued a draft licence under the Food and Environmental Protection Act 1985, a copy of which is before members. Condition 11 requires details of the provisions to secure adequate financial provision for decommissioning to be submitted before development commences. Also before the committee is the Scottish Executive's statement, which makes its position clear on the section 36 consents under the Electricity Act 1989.

What is the promoter's view of how decommissioning should be addressed? I ask you to base your reply on the FEPA licence and the Scottish Executive's view of the section 36 consents.

Mr Steele: We accept fully the need to put in place financial arrangements to support the decommissioning of the wind farm. It is now very clear that the Scottish Executive and Scottish ministers will take responsibility for ensuring that that is achieved. We have seen evidence of that in the FEPA licence conditions and in the statement from the Executive's section 36 consents people. There are a number of options for providing that financial assurance. Our view is that the precise means cannot be identified until we know how the project will be financed.

In conclusion, the committee can be assured that appropriate financial arrangements will be made to secure decommissioning. Before the wind farm can be built, the Scottish Executive needs to be satisfied about the arrangements that we propose in that respect.

Mr Trinick: I move on to consider one or two of the definitions in the lease. I turn to document RR/03/1/6, which includes an extract from the Crown Estate lease. The committee would like you to amplify one or two of the terms that are used, as they are not defined in the extract that you produced for the committee. As the terms relate to decommissioning, there may be some interest in them.

In the second line of paragraph 3.15.1, I note the use of the phrase "the Works". What does it mean?

Mr Steele: My understanding is that the reference is to the installation on the site, that is, the wind farm.

Mr Trinick: To be precise, does that mean the wind turbines and the substation or only the wind turbines or the substation?

Mr Steele: The phrase "the Works" refers to everything that is installed on the site.

Mr Trinick: Does that include the supply cables?

Mr Steele: Self-evidently, the supply cables will supply the electricity from the wind turbines to the shore. I do not have a copy of the detailed lease with me, but I imagine that it covers the cables.

Mr Trinick: I am leading you slightly, but is it your understanding that the commitment to the Crown Estate commissioners in the lease is to remove the entirety of the wind farm below the mean high-water level when the project is decommissioned?

Mr Steele: The commitment to the Crown Estate is to remove the works and the supply cables, which, as far as I am concerned, is everything. That is subject to the terms that are set out in the extract that is before the committee.

Mr Trinick: We might have to revisit this matter later in the day, convener. Paragraph 8.8 on page 10 of the precognition gives an undertaking to consult the RYA and the Solway Yacht Club on the submission of marking and lighting proposals to the Commissioners of Northern Lighthouses. During the day, we will find out whether we have reached total agreement on that undertaking and report back to you.

Mr Steele, paragraph 8.1 of your precognition addresses the publication of the commencement dates for the operation of the exclusion zones. You refer to

"Publication in Lloyds List"

and in

"a newspaper circulating in the vicinity of the wind farm".

You also mention

"such other means as Scottish Ministers may direct"

and state that

"It is understood and accepted that these measures will include notices to mariners."

Mr Copland in his precognition wants

"the dissemination … via Lloyds Shipping Bulletin … to be broadened considerably to include local yacht clubs, marinas, harbour masters, yacht chandlers and public launching facilities in the Solway Firth and Notices to Mariners".

Are you content with that approach?

Mr Steele: Subject to practicality and to our gaining detailed information on where we should send the notices, we would want to follow James Copland's helpful suggestions exactly.

Mr Trinick: If you were to receive from Mr Copland or the Solway Yacht Club details of the people to whom he wishes notification to be given, would you be content to provide that notification?

Mr Steele: Yes. We think that the clearer the matter is, the better.

Mr Mackenzie: I will not detain you long on the subject of decommissioning, but I want to be absolutely clear. Is it your understanding that any financial arrangements that are in place to remove the works would cover not only their removal at the end of their operational life, but their removal sooner than that, for example if the operator became insolvent?

Mr Steele: Clearly, the financial arrangements must cover the possibility that the works might need to be removed prematurely, although that would not necessarily happen in the case of insolvency. The answer is yes—we expect the arrangements to cover the range of outcomes appropriately.

Mr Mackenzie: If, in providing the FEPA licence, the Scottish ministers were to require a bond, would you go along with that?

Mr Steele: We would go along with that if the bond that was required could be obtained at a cost that enabled the project to proceed. If the Scottish ministers insisted on something that was too costly for the project to proceed, obviously the project could not proceed.

12:30

Mr Mackenzie: Let us move on to exclusion zones, on which I do not think you were asked any questions.

Before exploring how such zones would work, I refer you to paragraph 4.4 of your precognition, which makes reference to article 60 of the United Nations Convention on the Law of the Sea and reads:

"Article 60 … enables Member States operating exclusive economic zones to establish reasonable safety zones around artificial islands, installations and structures".

You have omitted two words. Article 60 allows the establishment of such zones "where necessary". That is perhaps the underlying dispute between the promoters and the objectors, who disagree about whether the exclusion zones are necessary. Do you agree with that?

Mr Steele: Clearly, if we had not thought that the exclusion zone was necessary, we would not have requested it.

Mr Mackenzie: Indeed. Do you agree that, as a matter of general principle, it is important that the law should be certain?

Mr Steele: Yes. That is one of the reasons why we favour exclusion zones, as opposed to more qualitative ways of regulating.

Mr Mackenzie: Do you agree that it is particularly important that the law should be certain where criminal sanctions may be imposed?

Mr Steele: Yes.

Mr Mackenzie: Do you also agree with the general principle that, given the fact that it is the promoter who seeks to change the law in this way, the onus is on the promoter to show why the existing law is inadequate to meet their concerns?

Mr Steele: I am not sure that it is appropriate to establish a presumption against what we propose. I think that our proposals are appropriate for the reasons that we have stated. Clearly, that can be debated, but that is our view.

Mr Mackenzie: I want to consider a little how construction exclusion zones might operate in practice. As I understand it, the proposal is to build 60 wind turbines, an anemometer mast and a substitution platform. In essence, is that correct?

Mr Steele: Yes.

Mr Mackenzie: How do you envisage that the works will be constructed? Will one turbine be constructed at one time, or will half of the field be constructed at one time, or what?

Mr Steele: That will depend on the construction programme that the contractor who makes the wind farm chooses. The contractor has not yet been selected. Clearly, the installation of the turbines will take place using specialist vessels, of which there are a limited number. Whether the contractor constructs the turbines using one or two vessels, or another number of vessels, will obviously depend on how the contractor wants to approach the matter.

The separate task of cabling might be done by different vessels, so it might be possible to do rather more of that task at the same time. Some activities on some towers might take place at one part of the site while other activities go on elsewhere. To be honest, I am speculating, because we have not selected the contractor and it would be the contractor's job to formulate his own construction plan, and his skill in doing so would enable him to put in a cost-effective price.

Mr Mackenzie: Is it reasonable to assume that the turbines will be built one by one, or perhaps two at the same time, rather than all at once?

Mr Steele: As I think I tried to say in my rambling answer a moment ago, my understanding is—and I may have this wrong—that the installation of the towers will happen one by one, with a vessel that will move around. Other activities will be going on elsewhere on the site, in order to have a smooth and efficient construction programme. If the issue is whether we will be building on the whole of the site all of the time, the answer is no, we do not think so. There will be times when parts of the site are not being used for construction, which is why the bill allows for the construction zone to cover parts of the site, rather than the whole site.

Mr Mackenzie: So, in short, is it envisaged that there will be different construction exclusion zones during different periods of the construction.

Mr Steele: I think that there is a trade-off between the simplicity and clarity—

Mr Mackenzie: I am sorry to interrupt, but before we get to the trade-off, is that right or not?

Mr Steele: I was trying to say that the zone might vary, and that in order to determine how much it will vary, if at all, we have to trade off the clarity and simplicity of having a fairly static zone against the potential inconvenience to mariners of having more areas off-limits than are strictly necessary for the construction process. I do not envisage that we would try to have a zone that changed from day to day, because nobody would be able to work out what was going on.

Mr Mackenzie: But you do envisage shifting or changing construction zones at various stages of the construction period.

Mr Steele: We have said that we will consult affected interests to ascertain what would be helpful and feasible. I am sure that we would want to do that.

Mr Mackenzie: It seems that, in principle, you are allowing for the possibility—and perhaps the probability—that there will be different construction zones. I am just trying to get a feel for how often they might change.

Mr Steele: I do not think that we have given a lot of thought to that, pending the appointment of the contractor. My guess is that we would not want to change the zone more often than every month or every couple of months, but that is a guess and a feeling, and the matter will have to be discussed with the contractor. That is why we might end up concluding that it is not practical to do anything other than have a fairly static zone.

Mr Mackenzie: A fairly static zone would cover the whole of the wind farm site.

Mr Steele: That is possible. The bill authorises that, and we could do that if the nature of the construction was such that the zone was bobbing around so much that to do anything else would just be too confusing.

Mr Mackenzie: Correct me if I am wrong, but it seems to me that, given the size of the turbines and the way in which they are likely to be put in place, it is more likely that they will be put in place individually. Therefore, it seems that the construction zone essentially will be around each turbine as it is put in place. If that is correct and the only construction work taking place would be the installation of a particular turbine, it could not then be said to be necessary to have a construction exclusion zone covering the whole wind farm site, could it? That would be excessive, would it not?

Mr Steele: As I said earlier, in addition to driving the piles for the individual towers, parallel activities are likely to be going on around the site. The ships will be doing various works and moving around from one location to another. It is a bit like a building site on land. People might well be pouring concrete in only one corner of the site on any particular day, but I am not sure that it is good idea

to have a public right of way through a building site just because the builders are not working in a particular area at a particular time. If it is possible to create a right of way that would be stable for long enough to be worth it, and if local consultees think that that would be a good idea, we want to be helpful.

Mr Mackenzie: The obvious difference is that the boundaries of a building site on land can be fenced off and made clear. Roughly how long might it take to undertake the piling operations and install the turbine?

Mr Steele: You are getting towards the edge of my technical knowledge on that topic.

Mr Mackenzie: Is it likely to be weeks rather than days?

Mr Steele: Given that the intention is to do most of the construction in a season—

The Convener: Mr Mackenzie, I am concerned that we are getting into the area of conjecture. There is no contractor in place and I am not aware that there is any construction programme. Therefore, I do not know that anyone could answer those questions with any certainty at the moment. I am unclear about where those questions are leading.

Mr Mackenzie: I take the point, convener, and am grateful. All I am trying to get at is that, in scrutinising legislation to see if it should be brought into force, one should try to see how it will operate in practice. That is the point I was seeking to make, but I will move on.

On the operational exclusion zone—I should say exclusion zones—each turbine would have an exclusion zone of 50m around it, as you see it. Is that correct?

Mr Steele: Yes.

Mr Mackenzie: The distance between the turbines will be roughly 500m.

Mr Steele: Correct.

Mr Mackenzie: Essentially, there will be 60 operational exclusion zones.

Mr Steele: Yes.

Mr Mackenzie: There will also be exclusion zones around the anemometer mast and the substation platform.

Mr Steele: Yes.

Mr Mackenzie: How will a person know what the boundaries of those zones are?

Mr Steele: The proposition being put to mariners is that they should stay 50m away from any structures in the wind farm. I do not think that we will have a radar speed gun to check whether someone is 49m away, but the clear instruction to the public is to give a suitably wide berth of 50m to all the structures. Most mariners given that instruction will be able to steer clear in a responsible manner.

Mr Mackenzie: Finally, in considering the need for the exclusion zones, I would like to ask you a number of questions about the consideration that you have given to possible alternatives. On the construction exclusion zones, what consideration have you given to existing practice whereby a notice to mariners is issued to keep people away from construction zones?

12:45

Mr Steele: We discussed that a bit at the preliminary stage. Clearly, a notice to mariners that they should stay out of the construction zone would inform those mariners who bother to look at and follow notices to mariners. We are concerned on a number of counts about people who might decide to take liberties with such advice. Some people might decide that they would like to take a short cut—I believe that the Health and Safety Executive has found that with oil and gas production rigs. Some people might use the area for various water sports activities, and I suppose there is a possibility that some people might deliberately trespass on the site for some peculiar reason. Therefore, our concern is that an advisory notice to mariners would not necessarily be heeded by all the people to whom it was directed.

Mr Mackenzie: What consideration have you given to existing civil-law remedies should there be deliberate infringement in relation to either the construction works or the operation?

Mr Trinick: That is a question about the law that is not properly directed at this witness.

Mr Mackenzie: To respond to that, Mr Steele is the witness from the promoter, which is advocating exclusion zones. I am simply seeking to explore with him what consideration the promoter has given to alternatives, including existing remedies. If there is another witness of whom I can ask that question, that is fine. However, I do not think that there is.

Mr Trinick: As a lawyer, I will deal with that point in my closing remarks, if that helps, convener.

The Convener: Does that help you, Mr Mackenzie?

Mr Mackenzie: Who has given what consideration to alternatives and when is a matter of evidence. It seems to be more appropriate for the witness, rather than legal submissions, to deal with that matter. Without wishing to be difficult, I would like to explore that issue.

Mr Steele: I am happy to answer in that frame, if that would be helpful.

Our view of the civil side is that it is quite uncertain. In order to persuade the court to give us an interdict, we would need to establish that someone was doing something wrong rather than simply exercising their right of navigation. It is a bit like when one is in traffic: it is always the driver in front who is misusing the rules of the road. Such a measure might become so confused—perhaps with lawyers being employed—that it might be rather difficult to work as a practical measure. We take the view that this is a building site and we would like people to please keep out.

Mr Mackenzie: I can perhaps address the committee in my closing submissions about the merits and demerits of various alternatives. However, I would like to ask Mr Steele whether he has read Mr Eardley's precognition in which he gives an alternative criminal remedy to exclusion zones. Do you recall reading that?

Mr Steele: Thank you for directing me to Mr Eardley's suggestion, which we considered. In effect, that suggestion replaces the navigation exclusion zone with a specific offence of obstructing construction or maintenance of, or interfering with or making paths to, the wind farm without reasonable excuse. The problem with that suggestion comes back to the issues of clarity and predictability. Is the person walking through the building site simply going for a walk or obstructing the building work, if he happens to get in the way of the builders? Navigating our way through those issues made us feel that it is a more complicated, less reliable and less clear approach than the simple putting up of a no entry sign.

The RYA proposal would not have the effect of creating an obligation to steer clear of the turbines during their operation. The exclusion zone would be a material contribution to reducing the likelihood of accidents, but the RYA proposal would lose that feature.

Mr Mackenzie: You have used the analogy of a building site. However, the operator of a building site does not have the benefit of the criminal law making it an offence to enter the site. It may be a matter for legal submissions, but I am not sure about that analogy.

Mr Steele: The operator of a building site has the benefit of the law of trespass, which perhaps we do not have offshore.

Mr Mackenzie: To be fair, perhaps such matters are better left to the legal submissions.

You also mentioned the analogy with North sea installations. Do you agree that there are a number of important differences between North sea installations and a wind farm?

Mr Steele: Yes. An oil and gas production platform is potentially more hazardous than the tower of a wind turbine. That is one of the reasons why we have suggested a 50m exclusion zone, rather than a 500m exclusion zone such as I believe applies offshore.

Mr Mackenzie: I am sorry. I missed the last part of your answer.

Mr Steele: My understanding is that oil and gas installations have a 500m exclusion zone. Because there is a lesser risk associated with wind turbines, which we accept, we have scaled that down to a 50m exclusion zone.

Mr Mackenzie: Thank you. I have no further questions.

Mr Rumbles: I would like to pursue that point. Much of the evidence that we heard earlier concerned mast heights and the need to avoid a catastrophic accident. Paragraph 4.1.2 of your precognition cites the following restriction:

"From the commencement of construction through to decommissioning, a restriction on trawling and anchoring throughout the wind farm site".

Paragraph 4.1.3 cites another restriction:

"From the commencement of construction through to decommissioning, a restriction on navigation within 50 metres of any wind farm structure".

So far, we have focused on the height of the blades. If we are concerned about ensuring that we do not have a catastrophic accident, would it not be more sensible to focus on the area of the exclusion zone? You have asked for a total exclusion zone for fishing and anchoring. Why have you not asked for a total exclusion zone for navigation as well? Are private yachts going to be dashing in and out of the turbines, coming within 50m of them? Thinking about safety, would it not be better to have the navigation exclusion zone on the same basis as the fishing exclusion zone?

Mr Steele: I shall answer that. It is always nice to be questioned about why we are not asking for more powers. The trawling and anchoring exclusion zone exists principally to protect the cables. There will be 33,000V cables in 1m trenches between the structures in the wind farm, and there is a risk that they could be fouled by a trawler or an anchor. The only safe way to deal with that risk is to forbid trawling and anchoring throughout the exclusion zone. I think that most people accept that snagging a 33,000V cable is not a good idea. I hope that that exclusion zone is not very controversial.

You asked whether we should have gone for a navigation exclusion zone of more than 50m. If observed, 50m will be sufficient to avoid a collision or the possibility of a mast of any feasible height hitting the blades. From that point of view, the

figure is a minimum. Do we feel that leisure craft would be wise to avoid the wind farm site generally? Yes. Do we feel, balancing the interests of users of the sea and the wind farm, that we can really ask for a complete exclusion zone? We felt that that was too big a thing to ask for.

Mr Rumbles: You suggest that sailing between the turbines and through the wind farm is not advisable, but you do not want to prevent it.

Mr Steele: Somebody who sails in the wind farm runs the risk of hitting a tower if they lose control of their vessel.

Mr Rumbles: I ask questions only as a lay person. Much of the evidence has focused on the size of the turbine blades. I have no specialist knowledge, but if you recognise that it is inadvisable to sail through a wind farm, it strikes me that the obvious thing to do if we are concerned about avoiding a catastrophic accident is to suggest an exclusion zone around the wind farm. I do not understand why the developer has not done that. I asked about putting a boom around the area so that vessels would not drift into it. Is that suggestion not sensible?

Mr Steele: We will mark the perimeter of the wind farm site with buoys and navigational aids, which will create a virtual boom to discourage people who want to avoid the site.

Mr Rumbles: Will you not create a physical boom?

Mr Steele: A physical boom would cause all sorts of complications. I am not very good at marine stuff, but I suspect that it would be quite difficult to make that work.

Mr Rumbles: I understand. As a lay person, I am trying to balance the logic. It seems strange that we have had a heated discussion about blades and safety in the case of a boat that—

Mr Steele: If people comply with the 50m zone, no accidents will occur.

Mr McGrigor: In paragraph 6.5 on page 7, you say:

"The Promoters recognise the possibility that other fishing interests may also be affected … we are willing to set up a fund of £50,000 for compensating such wider interests".

Do those other, wider, fishing interests include salmon and sea trout stocks?

Mr Steele: We think, from the environmental assessment and all the discussions that we have had, that the only fishery that will be disrupted by the wind farm is the shrimp fishery. We have not had representations in relation to other fish, most of which are caught much further out.

13:00

Mr McGrigor: I am talking about migratory salmon and sea trout stocks. For example, on the Scottish side alone, nine salmon rivers run into the Solway. I think that, on the English side, there are about the same again.

Although the development is new, the reason I raise the matter is that, if we want a precedent, when fish farming started up in the early 1980s and late 1970s, it was never envisaged, for example, that sea lice would be a problem to wild fish stocks. That problem had never been suggested.

There is an enormously valuable run of fish. I think that the capital value of salmon stocks is £6,000 per fish, so £50,000 would be a drop in the ocean if the building of the wind farm caused damage to the salmon and sea trout stocks. That is why I ask. I wonder whether you are putting anything in place to cover that contingency, which might run into many millions.

Mr Steele: The impact of the wind farm on fish stocks, as opposed to on the actual fishing activity, is a different issue. That issue was addressed in the environmental statement, which was published some months ago in connection with the section 36 application. The compilers of the environmental statement assessed the impact of the wind farm on each of a large number of fishing species, including salmon. They said that there was a high economic impact from salmon, as you have just said. Various aspects of the impact of the wind farm on the salmon—construction or decommissioning noise, suspended sediments, operation noise, the electromagnetic field, habitat changes and water quality—were assessed as negligible, negligible, negligible, negligible, negligible-low and negligible, so the environmental statement's assessment was that there would be no impact.

Mr McGrigor: Is that the report that was done by Fisheries Research Services in Aberdeen?

Mr Steele: That was the environmental statement that was assembled for us by Natural Power Consultants, who were our environmental consultants for the environmental statement.

Mr McGrigor: The report states that up to 100dB of noise will be generated in respect of the turbine operation. It also states that the hearing threshold for salmon is 100dB to 120dB. That is why I am raising the point.

The second aspect that you mentioned was the possibility of magnetic fields. I see that cables are being buried in shifting sandbanks, so presumably, from time to time, they could be exposed. It is well known that salmon and sea trout use magnetic fields to get back to their own rivers. It is

possible—I agree that this is hypothetical—that there could be a problem with electrical fields playing havoc with salmon and sea trout navigation systems.

Mr Steele: All I can really do is rely on the environmental statement, which said that the impact of EMFs on salmon was negligible. Clearly, if people want us to examine other issues, we will see what we can do. However, the environmental statement was pretty unequivocal on the matter.

Mr McGrigor: I take those comments on board. You referred to the environmental impact assessment. However, it has been suggested that the relevant authorities might make it a mandatory condition that the proposed developers put in place an insurance bond of suitable value to provide for compensation and reinstatement of affected salmon fisheries, should there be any detrimental effects.

The Convener: I think that that might be outside our remit, Mr McGrigor.

Mr McGrigor: I am sorry, convener.

The Convener: That is okay. You are entitled to ask questions.

Mr McGrigor: In that case, I wonder whether the proposed developers are thinking of putting in place such a bond.

The Convener: I do not think that that is really our business either.

Mr McGrigor: The question refers to sea fish stocks. I thought that our remit included fisheries.

The Convener: Yes, but this is about fishing rights. Our concern is about interruptions to fishing rights and navigation. I think that you might be straying into other areas.

Mr McGrigor: I take your point, convener. I apologise.

Mr Home Robertson: I have questions on two areas that I hope I can deal with quickly, because I want to move on. Following on from Jamie McGrigor's question about compensation for loss of fishing rights, I wonder whether you will provide us with details of your agreement with the Solway Shell-Fishermen's Association, which led to the withdrawal of its objection. I am not asking you to read those details into the record, but I would be grateful if you could let us have a copy of the agreement in writing. It is probably relevant to our considerations.

Mr Trinick: Yes, we can provide you with a copy of that.

Mr Home Robertson: Thank you—that will do nicely.

On decommissioning, committee colleagues will be aware that one of my interesting responsibilities is chairing the group that oversees the construction of the Holyrood Parliament building. That has led to an acute awareness of the possible weaknesses of parent company guarantees, which at any given time seem to be only as strong as the guarantor's assets. I presume that you would accept that.

Mr Steele: I would accept that in the same way as I would accept that the bond is only as strong as the assets of the bank that gives it.

Mr Home Robertson: Yes. However, if we simply stay within the terms of the lease that has been proposed by the Crown Estate, what would happen if the parent company went out of business and was unable to meet the obligation?

Mr Steele: In such a scenario, if the owner of the company went out of business, the wind farm would most likely be sold debt-free to another operator, who would continue to operate it. That has happened to a large number of gas-fired power stations in the UK whose proprietors have gone out of business.

Mr Home Robertson: I would accept that response if we were talking about a going concern. However, if for whatever reason the wind farm was not an attractive commercial proposition, we could be left with a lot of structures in the middle of the Solway that no one wants and for which no one is in a position to take any responsibility.

Mr Steele: That is why we have said that we are prepared to work with the Executive to support the decommissioning obligations thus far with additional financial assurance.

Mr Home Robertson: That might be so, but if we are serious about making bankable provision for the proper decommissioning and clearance of the site, there is really no substitute for putting cash up front in the form of a bond.

Mr Steele: I do not think that that necessarily follows.

Mr Home Robertson: What does, then?

Mr Steele: Such matters can be secured in a variety of ways. Putting cash up front in the form of a bond could be unaffordable. I do not know the precise cost of decommissioning a site. However, allowing for inflation over 20 or 25 years, I do not know how we would be able to stump up that kind of cash up front.

You need to find a mechanism that provides completely adequate assurance and ensures that the project is viable. There are a large number of ways in which that could be done. For example, it might well be that the credit rating of the company that is guaranteeing the obligations is better, or as good as, the credit rating of most banks. In such a

circumstance, it might not be necessary to require a bond until such time as that situation changes. It might be possible to arrange for the decommissioning to be funded in stages as the project builds. For example, such money is not set aside up front for nuclear power stations but is contributed in stages over their lifetime.

Mr Home Robertson: That is not my understanding, and I represent a constituency in which there is a nuclear power station.

You talk about what is affordable and I appreciate that, for you, what is affordable today is of paramount importance. However, others might say that it is equally important that there should be long-term provision to ensure that any redundant structures are cleared up rather than left to fester in the middle of the Solway.

Mr Steele: That is why we have agreed to conditions in the FEPA licence that require us to put before the Scottish ministers a scheme to achieve the appropriate financial assurance. That can be drawn up in the light of what we know about how the programme will be financed at the time. We must do that before we start construction.

Mr Home Robertson: I have a notion that the committee might want to consider this matter further.

The Convener: Obviously, the general public would like a little more clarity in the reassurances about what will happen with regard to decommissioning. I understand what you say about the credit rating of certain companies being as good as the credit rating of most banks, but if this were happening two or three years ago and the promoter of the project were Enron, we might have been led up the garden path.

Mr Steele: I think that Enron had a low investment grade rating. That is the usual credit rating for a company that might have a difficulty. There are a number of credit ratings that are significantly better than that. In commercial negotiations, it is quite common to require performance assurance as and when a company's credit rating drops to a low investment grade rating or below, rather than doing so at a time when the company has a high credit rating. That might or might not be acceptable. Certainly, no other developments in the UK that I am aware of are required to put cash up front in the way that has been suggested. A change in the law to require that to be the case generally would have a big impact on the amount of construction.

The Convener: Do you see a bond for decommissioning as cash up front or as a form of underwriting?

Mr Steele: It is possible that certain kinds of bond could be achieved—we are not ruling out a bond. Whether we would do so depends on who the ultimate guarantor of the project will be. For example, a company such as Powergen might take an interest in the project. Its parent company, Eon, in Germany, is bigger and has more money than most banks. It is likely that the matter of a bond would be approached differently in that situation than it would be if the equity were owned by a smaller company.

We are saying that the Scottish Executive is on the case and can insist on whatever conditions it sees fit. We will comply with those conditions subject to the possibility that we are asked to do something that the project cannot afford, in which case we will either have to abandon the project or the Executive will have to change its mind.

The Convener: I take it that that would apply if the committee decided to recommend that a certain course of action be incorporated in the bill.

Mr Steele: Recommending that a course of action be included in the bill would lock in that course of action. If the nature of the way in which the course of action were to be financed meant that it would not be feasible, there would be a problem. That is why we ask the committee to allow the Scottish ministers to come up with something that is feasible.

The Convener: Thank you, Mr Steele.

13:16

Meeting suspended.

14:17

On resuming—

The Convener: Good afternoon and welcome to members of the public. Our first witness this afternoon, Mr Alfred Bennett, is here at the request of the committee. Mr Bennett will speak about the agreement that the Solway Shell-Fishermen's Association has reached with the promoters and how that has impacted on the association's decision to withdraw its objection to the bill.

MR ALFRED BENNETT *took the oath.*

The Convener: How much fishing activity is there in the area of the proposed wind farm by fishermen other than members of the Solway Shell-Fishermen's Association?

Mr Alfred Bennett (Solway Shell-Fishermen's Association): I am not in a position to answer for fishermen who are not members of the association.

The Convener: So you have no idea what other fishing activity takes place in the area of the proposed wind farm.

Mr Bennett: Other activity takes place, but shrimping is the main activity in the area.

Mr Rumbles: How many vessels does the association cover?

Mr Bennett: Our association has six or seven members. There were eight, but one member left.

Colin Campbell: It has been suggested that once the wind farm is in operation there might be some work, such as maintenance and so on, for some people who have boats. How many boats that would otherwise be occupied in fishing might that activity occupy?

Mr Bennett: All the boats in Silloth are fishing, so I think that there is only one that could do the work that is being looked for. Two of us are producers, so we would have to carry on fishing.

Mr Rumbles: This morning we were told that we would receive details of the agreement that you reached, and I am quite happy about that. Was there any resistance within the Solway Shell-Fishermen's Association to the agreement, or was everyone happy about it?

Mr Bennett: There was one little bit of resistance, but it came from a part-time fisherman, who is also a driver of heavy-goods vehicles.

Mr Rumbles: Is the association quite happy about the agreement?

Mr Bennett: The professional fishermen are quite happy about it. Well, it is better than nothing.

The Convener: Did the promoters give any indication of the methodology by which they decided that they would put £50,000 into the fund to compensate others? You have already told us that you cannot quantify how many others there are, but did the promoters give any indication of why they thought that £50,000 would be adequate?

Mr Bennett: I can quantify that there are at least another four shrimp-fishing vessels in the Solway. There are possibly five, because another vessel left Silloth just a couple of weeks ago. Apart from that, I do not know how the money will be distributed.

Mr Home Robertson: Is the one objector in the Solway Shell-Fishermen's Association part of the deal that the association has agreed to?

Mr Bennett: No.

Mr Home Robertson: So, if he has opted out of that, he will need to take his chances among those who will share the £50,000.

Mr Bennett: That is right. As I said, he has been an HGV driver for three years. He is not a professional fisherman. He has a 20ft boat and was offered compensation, but he decided that he would take his chances.

Mr Home Robertson: Somewhere down the line, we will be told what the deal is, but we have not seen it yet. Can you tell us on the record how much money is involved?

Mr Bennett: I can provide the committee with the information in writing, but I will not tell it here. I have been asked not to disclose it.

The Convener: We accepted such an offer this morning, so we will accept it from Mr Bennett as well. Do Mr Trinick and Mr Mackenzie have any questions?

Mr Trinick: I have no questions.

Mr Mackenzie: No questions.

The Convener: I hope that Mr Bennett found that to be reasonably brief and painless. I thank him very much.

Our next witness is Mr Alan Cubbin of the Maritime and Coastguard Agency, who is here at the request of the committee. The committee is interested to hear evidence on the minimum clearance of the turbine rotor blades.

MR ALAN CUBBIN *took the oath.*

The Convener: Mr Cubbin, I remind you that, as was the case this morning, witnesses are required to restrict their remarks to information contained in precognitions. Does a committee member wish to begin questioning?

Mr Rumbles: Mr Cubbin, will you comment on the promoters' proposal for an active management system. How effective will that be?

Mr Alan Cubbin (Maritime and Coastguard Agency): Earlier this morning, a letter from the Maritime and Coastguard Agency was discussed. I would like to give a short history of where that attachment came from. We were approached by the Civil Aviation Authority, the Ministry of Defence, Bristow Helicopters—which operates our helicopter system—and the Royal National Lifeboat Institution to try to develop a generic procedure for wind farms.

You will notice that the procedure that is attached to the letter is not for Robin rigg per se; it is a general procedure that we are trying to develop for all wind farms throughout the UK. The procedure addresses search and rescue, counter-pollution and salvage operations. We felt that it was important that we learned our lessons from the North sea before we developed the procedure. In the North sea, rigs take an active role in the management of search and rescue, counter-pollution and salvage operations. Rigs initiate command and control activity by the coastguard, but that has caused some problems. We determined that the best way to approach the wind farm situation was to have the person in distress initiate a search and rescue, counter-pollution or salvage event.

It is therefore important that the communications in the system are as robust as we can make them, so part of the task was to develop the outline of a procedure that we would put in place for everybody. The search and rescue response in a wind farm should be carried out only by helicopters, RNLI lifeboats and emergency towing vessels. We would not use what are known as the ancillary services. So, in a search and rescue situation, some wind turbines might therefore need to be closed down.

For counter-pollution activities, when we might over-fly with our spraying aircraft, the wind farm would almost certainly need to be closed down. In a salvage operation in which a vessel within the farm has had an incident, close communications with the wind farm operator and the salvagers would clearly be needed.

It is therefore important that communications are robust. We put together as a basic document the letter to which I referred. As has been said, it is incomplete and contains empty square brackets. We have looked at the document again and we know that it says:

"All wind turbine generators … will be marked with clearly visible identification numbers".

What it does not say is that lights will be required to illuminate the number on the side of a tower. If someone gets into problems, they need to be able to tell us which wind turbine is close by, so that we can contact the control room and have that turbine closed down.

That is the background to how the procedure has developed. It will apply to Robin rigg, but it will not be written for Robin rigg.

Let us move on from that. The papers that have been presented to the committee contain a section that deals with VHF communication and says that a radio shadow of 150m could affect communications with our control centres. The promoters' original deposition said that further work would be done on that and we welcomed that, but Mr Badger's further supplementary precognition says that there is no need for such work. We wish to discuss that further with the developers.

Similarly, Mr Badger's further supplementary precognition contains a comment on radar coverage, for which there is a 90m radar shadow. The point was made early that the "bagatelle effect"—the staggering of the wind farms—could make that shadow much larger, but we do not know about that so—again—further work was proposed. The information that has been provided to us on radar coverage has been based on a radar system that uses a 12ft scanner, which is a very high resolution scanner. Most of our radars do not have that resolution.

We would want to work closely with the developers to see whether we can understand what would be the effect of the radar on rescue craft, including RNLI lifeboats. We want to see what are the limitations on the radar in the field. Those are our concerns about the proposed management system. We think that although it is a good start, it needs some refining.

Colin Campbell: The promoters say that, using the management system they have in mind, the turbines could be shut down in 60 seconds. That said, we have to bear it in mind that the information has to go from the ship in distress to the MCA and then to Denmark before it can be acted upon. Is that a feasible system?

Mr Cubbin: One of the things that we are continuing to discuss in a generic sense is testing. We believe that there should be a requirement to test such systems at least twice a year. Ideally, we should test the wind farm system before it goes into commission, to see whether a turbine can be shut down within 60 seconds. Indeed, it will be 60 seconds after the turbines have stopped before the rotor stops completely. It is important that the system be tested before it goes into commission.

After that, the system should be tested while it is in commission. Normally, all our emergency systems are tested a minimum of twice a year and there is no reason why the same testing system should not be undertaken in this instance. I am not talking about testing the entire wind farm; for example, the test could involve us calling the wind farm, asking for turbine number 16 to be shut down and observing what happens.

14:30

Colin Campbell: Will you confirm whether the coastguard station that would receive the information from the wind farm is manned 24 hours a day?

Mr Cubbin: Yes—it is manned 24/7, 365 days a year. We have four officers on watch every hour.

Colin Campbell: If four people are on duty on each watch, does that mean that tea breaks and things such as people going out for a fag are taken care of?

Mr Cubbin: Yes. We are covered all of the time. If we receive a 999 or a VHF call, we respond immediately. We have a procedure under which calls are immediately put through to us.

Mr Home Robertson: It is interesting to hear that you are working up procedures, not only for Robin rigg, but for all offshore wind farms that might be developed around the UK coast. I was especially interested to hear your concerns about the evidence that we heard earlier today about the efficacy of radar in the cluttered environment of a

wind farm. I imagine that the committee would be interested to hear any further information that you might have on that subject.

I wonder whether you would take a minute or two to explain how a hypothetical search and rescue operation would be carried out. I am thinking of a situation in which a vessel—a fishing vessel or yacht or whatever—has been driven by bad weather conditions in among the wind turbines. We know that as soon as the incident is reported either the whole wind farm or the individual turbine would be shut down. In such rough conditions and such a cluttered environment, how would a lifeboat or helicopter operate? I am thinking of sharp blades sticking up in the air and so forth. How difficult would it be to extricate casualties in such an area in those circumstances?

Mr Cubbin: The standard response to an incident is determined by the extent of the initial information that we receive. If the incident involved a fishing vessel, our initial response would be to immediately task a lifeboat and, in all probability, a helicopter. The information that we have determines the other back-up we bring in.

In the event that we receive a VHF mayday or pan-pan call, we ask the operator to give us his location. In the case of wind farms, we have three methods of identifying the vessel's location: the operator giving his location; the operator identifying any of the wind farm turbines that are visible; and the operator's global positioning system, which we are not using as much as we might in future. The reason why we do not use GPS so much at present is that it is not as accurate as everybody thinks it is. We tend not to rely on it as a physical means of identifying the position of a vessel.

Our immediate response to such a call is to send the front-line response teams to the vessel. In the event that we cannot find it, we use the oil-spill response information system, which is a drift predictor. If we know what type of vessel is involved, we can feed the information on winds and tides into the computer and get a best-drift estimate. The system can be used for bodies, ships and oil. The search would then spread out; clearly, the longer the search continues, the bigger the area involved becomes and the more resources we have to put in.

That is our general approach. We would not change that in any great detail when dealing with the wind farm, except that helicopters would not operate over the whirling blades; the turbines would have to be shut down. If only half a dozen have to be shut down, that is fine, but the entire farm might have to be shut down to allow a helicopter to operate.

Mr Home Robertson: That is helpful. We all know that the sea is a bad place to be in severe conditions and that lifeboat and SAR crews are accustomed to operating in bad conditions and difficult areas. I am trying to get my mind round whether a wind farm is different. Are we creating a new set of circumstances in which it will be more difficult for helicopters or lifeboats to operate? If a small vessel impacts on a turbine, gets into severe difficulties and drifts further into the wind farm, how much more difficult will it be for a lifeboat or a helicopter and winchman to access the casualties? Are there similar circumstances off the coast at present?

Mr Cubbin: No, which is why we produced a generic draft procedure. We will have to test the procedure and exercise it in various modes, including in fair and foul weather. I cannot think of any comparable circumstances.

Mr Rumbles: The promoters seek legislation to create an exclusion zone around each of the turbines, which will allow for navigation corridors through the wind farm. This morning, we had a big discussion about the safety issues of blade clearance and how to avoid leisure craft having catastrophic accidents involving the blades. I would like to ask you two questions that I asked this morning. From a safety point of view, would not it be better to have one big exclusion zone for navigation rather than 60 small exclusion zones? Would it be practical to put a boom around the exclusion zone to ensure that there is no accidental drift?

Mr Cubbin: I did not hear your question about the boom this morning, but I heard a secondary remark that you made about it. I must be honest and say that a boom would be a danger to navigation.

Mr Rumbles: Right. Will you explain why?

Mr Cubbin: It would be a danger primarily because it would be an obstacle or barrier that could not be navigated around. To be of any use, the boom would have to be substantial and would thus achieve the opposite of improving safety.

The question of exclusion zones and safety zones is a difficult one. In various documents in the information that the committee has, there is reference to safety zones, which are an international concept, and to exclusion zones, which are not an international concept. I do not want to get into the legal technicalities because the issue is not my area of expertise and others are considering it. However, a safety zone that covered the whole farm would not be effective—I should not say that it would be a waste of time—because people inevitably would go into the gaps between the turbines.

Mr Rumbles: Do you believe that people will sail among the turbines anyway?

Mr Cubbin: Yes. For example, the Sunday-afternoon sailor might sail out to see the wind farm. People go to see the wind farms in the lake district and in Norfolk; the same will happen at sea. On a nice sunny afternoon, that will not be a great problem. Such people would be unlikely to sail out in the middle of a force 8 gale, so there is a safety assurance in that.

The Convener: Mr Cubbin, do you have any views on what the minimum clearance between a rotor blade and the high-water level should be?

Mr Cubbin: It should be sufficient.

The Convener: Thank you very much.

Mr Cubbin: We do not have a procedure that sets the minimum clearance because that depends on the vessels and the commercial traffic in the area. We suggested that what is called a traffic survey might need to be done; the embryonic information for a traffic survey is in the documents and we could make a risk assessment from such a survey. The promoters have partly done one, but we are not sure that we agree with it. As members will see from our letter to Mr Badger, we are trying to work up a procedure that is similar to the promoters' procedure, which will show them how we think they should conduct their safety regime and risk assessment. Robin rigg is just ahead of the game.

The Convener: So you do not have a conclusive view just now.

Mr Cubbin: No.

Mr Home Robertson: Will you have a conclusive view in the foreseeable future?

Mr Cubbin: Yes.

Mr Home Robertson: How soon?

Mr Cubbin: I expect to have within six to eight weeks a document to discuss with the industry at large.

Mr Home Robertson: We need to know.

Mr Cubbin: I understand that.

Mr Home Robertson: We are considering how the bill's navigation and fishing aspects will affect Scottish waters and we will probably want to ensure that there is proper safety. We need guidance from professionally qualified people from your agency—such as you.

Mr Cubbin: We floated ideas to the Scottish Executive, the DTI, the Department for Environment, Food and Rural Affairs and the Department for Transport, to get a cross-Government position.

Mr Home Robertson: Perhaps you could also put the Scottish Parliament on your mailing list—the Parliament is different from the Executive.

Mr Cubbin: I understand that clearly now.

Mr Trinick: I have just a couple of questions for Mr Cubbin. The MCA letter that Mr Badger produce earlier is from Mr Dymond and is dated 17 February. The words "Robin rigg" do not appear in the letter or its attachment, but the letter is addressed to Mr Badger, so I presume that Mr Dymond knew that he was writing to the Robin rigg project manager.

Mr Cubbin: Yes.

Mr Trinick: Thank you. I am not sure what the phrase "review the attached document" means in the context of the evidence that you just gave. Does that phrase mean that what you sent should be reviewed?

Mr Cubbin: Normally, if we approve a procedure we say in a letter that the procedure that is attached is approved. However, the procedure that we are talking about is not complete. For example, you referred earlier to the fact that there are empty square brackets in the draft text where there should, for example, be figures about heights in metres above the water line. We reviewed the procedure and, because it is a draft procedure that we are using for all rigs, it applies to Robin rigg.

Mr Trinick: All right—it is just that the wording of your procedure is so staggeringly similar to that of the procedure that Mr Badger drafted and sent to the MCA. The procedures were produced entirely independently, were they?

Mr Cubbin: No. We did not say that we had not plagiarised Mr Badger's procedure. It is obvious that we try to take best practice from the industry. It seems that Mr Badger's procedure is one that the industry says it can live with; we are just trying to amend it. For example, I believe that we added amendments 5 and 6 to the first section.

Mr Trinick: That is right.

Mr Cubbin: Since then, we have developed the procedure further. We believe that we need to be slightly more explicit—at all times—about the number identification of turbines. We also believe that there is a need for lights.

Mr Trinick: Certainly, but what I am getting at is whether the document that is attached to the MCA letter represents the result of a process of discussion between Mr Badger and the MCA.

Mr Cubbin: I cannot answer that. I was led to believe that there was a discussion with the CAA, which Mr Badger was party to. Perhaps Mr Badger can clarify that.

Mr Trinick: I am sorry—did you say the CAA?

Mr Cubbin: I refer to the Civil Aviation Authority, which was involved because of helicopter risks.

Mr Trinick: The second paragraph of the letter states:

"The requirements and procedures described in this document represent a feasible and effective approach to mitigating the potential risks … when the subject of, or involved in, a search and rescue, counter pollution or salvage operation."

It says "feasible and effective". If we look at the document, we see the reference to a 60-second shutdown. Paragraph 3 of the attachment refers to a 60-second shutdown. It seems to be that, whatever your evidence might be today, the letter that is before the committee from the assistant chief coastguard of the MCA confirms that that system represents

"a feasible and effective approach".

Mr Cubbin: I am not saying that it is not a feasible and effective approach—I am saying that it is not quite as explicit as we would like it to be.

Mr Trinick: I see. In any event—I thank you for this—the MCA has confirmed in the final paragraph of the letter that it "will co-operate fully"—I presume that that means that it will co-operate with the Robin rigg wind farm operators as well as with wind farm operators in general—

"in carrying out the procedures described in the document."

Mr Cubbin: Yes.

Mr Trinick: Thank you. That is very helpful.

I will move on to radar and VHF. It is not your fault, but you were not here this morning when Mr Gallagher gave evidence.

14:45

Mr Cubbin: No.

Mr Trinick: Again, it is no fault of yours—the document emerged only today—but you have not seen Mr Gallagher's technical note on radar and VHF, which was promised in Dumfries on 11 November last year, and which gives further information.

Mr Cubbin: I have not seen the note unless it is in the original documents.

Mr Trinick: No—it is not. To be fair to you, it is an additional document that you will not yet have had the chance to review.

Mr Cubbin: I have not seen it.

Mr Trinick: That is all right.

The MCA, in consultation with the DTI, DEFRA, the Executive—but not, as I understand it, the Parliament—and perhaps other bodies, is pulling together a document to advise on minimum clearance. Has there been any consultation with the industry to date?

Mr Cubbin: No. We need to be careful, because the consultation will cover traffic in the area of a wind farm. From that, there might emerge the need for a minimum clearance, on which a draft procedure will be sent to the industry for the development of risk assessment for wind farms. It will be discussed fully with the industry before it is put into action.

Mr Trinick: Very well. Thank you, convener—I have no more questions.

Mr Mackenzie: Mr Cubbin might not be able to answer one or two of my questions: if that is the case, please just say so. You have talked of the need to consider the traffic in the area. Does that include the traffic over the lifetime of the development?

Mr Cubbin: No.

Mr Mackenzie: Why not?

Mr Cubbin: What we normally do for traffic surveys for any proposal that affects navigation is take a period of time when we monitor the traffic using both land-based and ship-based radar. We try, over that period, to build up a traffic picture, but unless we know of any extensive modifications to that traffic, such as a new port being introduced, we will not try to project such increases into the future.

Mr Mackenzie: Do you see any need to do that?

Mr Cubbin: No. Once the picture has been established, if there were any proposal to develop something that would impact on that traffic survey, we would examine that in relationship to the wind farm.

Mr Mackenzie: If the question is about what is reasonably foreseeable, would not there be a need to try and foresee how circumstances might change in the future over a lengthy period of 20 to 25 years?

Mr Cubbin: No. We would not do that within the current system for any of our traffic surveys.

Mr Mackenzie: Is it your position that no notice should be taken of possible changes in the future?

Mr Cubbin: We do not take notice of changes that we do not know about. That question is like asking whether when we did the traffic survey for Holyhead 15 years ago we should have anticipated the introduction of the high-speed ferry between Holyhead and Dublin. Fifteen years ago, those vessels did not exist and we could never have projected their existence. When that service was introduced, we examined it in relation to the traffic in the area.

Mr Mackenzie: My last question to you is on another point. You said that consideration is being given to clearance heights. Is it your position that an active management system can be a complete answer to the clearance issue? For example, if a clearance height of 1m were suggested, would your position be that an active management system could take account of any safety concerns?

Mr Cubbin: You used the phrase "a complete answer". There is no complete answer, in the sense that whatever system is put in place, there will always be a risk at the end of it. That said, if we were offered a case being made for 1m clearance, we would probably say no to it.

The Convener: There are no further questions from committee members. Thank you very much, Mr Cubbin.

Our next witness is Mr Jerry Eardley, from the Royal Yachting Association. Mr Eardley will give evidence on minimum clearances, the need for enforcement of the exclusion zone and decommissioning.

MR JERRY EARDLEY *took the oath.*

Mr Mackenzie: I start by asking you to clarify the RYA's general policy on wind farms.

Mr Jerry Eardley (Royal Yachting Association): As far as the building of wind farms is concerned, we take a broadly neutral stance. As I have said to the committee, we do not object in principle, and have not objected in principle, to any of the developments that have been proposed so far, nor do we anticipate doing so in the future. We have, I think successfully, confined our representations and the specific objections that we have made to points that seemed to us to affect our sector's interest, which is—broadly speaking—the protection and defence of our members' navigational interests and, as far as possible, those of the general community of leisure-craft users.

Mr Mackenzie: There has been a suggestion that there should for safety's sake be an exclusion zone that would cover the whole site during its operation. What is the RYA's position on that?

Mr Eardley: Until now, I do not think that there has been any serious suggestion that any developer would contemplate that, so we have not established a position on the matter. However, I am confident that we would take a view similar to that which we have taken on the general concept of exclusion zones, which is that we do not think that they are necessary. We would probably go a bit further than that and add points not only if there was a serious proposal for an exclusion zone around this or any farm, but if there was the likelihood that there would be similar proposals for many other farms in the future.

Mr Mackenzie: What do you mean by "other farms in the future"?

Mr Eardley: I think that it is now becoming well established that it is highly probable that the Government will invite developers to bid for other sites in the second and subsequent rounds of wind farm development. In making a projection on the basis of the capacity figures, the resource figures and everything else that is now in the public domain, it is clear that the number of prospective wind farms is very many more than are currently being proposed in this first pioneer round—if "pioneer" is the right word to use.

Mr Mackenzie: You said that you do not consider exclusion zones to be necessary. Why is that?

Mr Eardley: I will deal with the two types of zone that the developer and other developers have proposed. As far as construction is concerned, we do not object in principle to the notion that it is crucial for the developers, for vessels, for their crews and skippers, and for the public interest that the process of building a wind farm be unimpeded. That is common ground, and there is no problem with that. The question is how to achieve it.

There seems to be a notion that the creation of a formal zone, incursion into which would carry criminal penalties, will be sufficient to deal with either the safety or the nuisance aspects which also appear to concern the developer. Our view, based on years of experience, is that—in our sector at least—marine users take seriously matters of their use of the sea, their navigation and, specifically, their planning of particular passages. They would be unlikely deliberately to navigate their vessels in such a way as clearly to interfere with the building process or the site.

If the users' judgment about that was in conflict with that of the developer—who is, after all, building us a site—and they were asked by a patrol vessel please to stay further away or navigate the site, the vast majority of skippers would accede to that firm advice. We have no objection whatever to a means being found for the promulgation of information that would explain from which areas it is necessary to stay away at a particular stage in the construction process.

Mr Mackenzie: Is that essentially what happens now in practice regarding construction works at sea?

Mr Eardley: There is not much experience of construction works of this kind. There is plenty of experience of people keeping well away from other marine operations, such as long-term dredging operations and civil engineering works at sea generally.

Mr Mackenzie: Is that the notice-to-mariners system that is referred to in your precognition?

Mr Eardley: Yes. Also, in case anyone has not read such notices or is not aware of what is going on in a particular location, vessels are conventionally marked and lit.

Mr Mackenzie: Paragraph 2.39 of your precognition suggests alternative wording to deal with the particular mischief of deliberate infringement or trespass. Where did you get that wording**?**

Mr Eardley: It is certainly not my own—I borrowed it shamelessly from another developer whose identity I cannot now recall. It is a fairly common form of clause, the precise wording of which is not important as long as its objective is achieved. From our point of view, the purpose of an alternative suggestion of that kind is to recognise the developers' concerns about the risk of someone misbehaving in some way. It would also give the developer the power to threaten to prosecute and, if necessary, to prosecute an offender who persistently and wilfully refused to take the developer's sensible advice to cease interfering with their operation.

If there is to be a criminal process, it should be the minimum that is necessary to achieve the objective. That minimum should also be specific to the mischief that is being addressed. Rather than catch everyone by preventing them from entering this sea area by criminal sanction or a formal exclusion zone, the developer will be able to caution individuals that they must go or risk prosecution.

15:00

Mr Mackenzie: Before I leave the issue of exclusion zones, I ask whether, in your view, the exclusion zones that are sought by the developer are likely to reduce materially the risk of collision between vessels and turbines.

Mr Eardley: I do not believe that they will.

Mr Mackenzie: Why not?

Mr Eardley: I have tried to deal with the question of the construction phase, at which point the important matter is getting information to people—I will return to your question, but I wanted to make that point clear. We are unhappy about the moving construction zone being penally enforced because the time lag that is involved and the need for developers to have a flexible construction programme will make it impossible, in my view, for the criminal law to be sufficiently clear. Enforcement of the zone would be better done by the more flexible means of notices and whatever the experts at the MCA can devise to provide some kind of area-to-be-avoided status. I am not sure what that might be, but we would be happy with something that would make it quite clear that vessels of all kinds should keep out. That is not the same as saying that it is necessary to use the criminal law process to penalise people who are nearby.

Mr Mackenzie: I am conscious that we are short of time. Let us move on to operational exclusion zones.

Mr Eardley: Yes. First, as far as vessels in our sector are concerned, once the site is up and running and the turbines are operational, it seems to be very unlikely that vessels of the size with which we are concerned will cause any significant damage to a structure that is something like 18ft in diameter and has walls 3in thick—although the vessels might do themselves some damage. It would be sensible to keep away from the structures, and I think that most sensible people will not go anywhere near them. If they do, there is the risk of problems, damage or a casualty.

Mr Mackenzie: What is the most likely set of circumstances that would bring about a collision between a vessel and a turbine?

Mr Eardley: The most likely set of circumstances is that a vessel will by accident, through misjudgment or because of one or more of a variety of other factors—especially in an area where there are strong tides, or which is difficult navigationally—find itself set among the turbines without the crew being fully in control of the vessel.

Mr Mackenzie: In those circumstances, would the existence of an operational exclusion zone materially reduce the risk of a collision?

Mr Eardley: It would be a complication rather than a remedy or helpful regulatory device.

Mr Mackenzie: Let us move on to the topic of clearance height. I would like to clarify a matter that was raised this morning. In the bill, there is talk of "mean high-water springs". What is a high-water spring?

Mr Eardley: High-water spring is as found in almanacs. It is a predicted height of the tide, or of the sea surface. It is a prediction. It is not always accurate, but it is mostly accurate at any point in the calendar. The mean high-water springs is the average—over the year—height that the tide reaches during the fortnightly spring cycle. The spring cycle recurs every fortnight and the neap cycle recurs every fortnight. That cycle is a broadly shallow sinusoidal curve. It varies slightly, but the height of high water usually stays approximately the same for two or three days in a row.

Mr Mackenzie: So a high-water spring tide occurs approximately every fortnight.

Mr Eardley: Yes.

Mr Mackenzie: And a mean high-water spring tide is the average of those tides over a year.

Mr Eardley: Yes.

Mr Mackenzie: As I think is accepted by the promoters, some allowance has to be made when considering the issue of clearance for higher levels that may be brought about due to weather conditions, with wave and tidal surges. The figure of 2.1m was suggested this morning. In addition, I suggest that an allowance should be made for the equipment on top of masts. Can you explain what equipment may be found on top of a mast?

Mr Eardley: Boats vary but, generally speaking, a conventional, modern boat will carry a VHF radio aerial and, possibly, some position-finding equipment. It will also carry lights. Lights will not project very far up; the length of a radio aerial will vary, depending on the type, but is typically between half a metre and a metre.

Mr Mackenzie: So it is your position that, in considering the clearance issue, some allowance should be made for what may be found on top of masts.

Mr Eardley: I think so. If a vessel got into such difficulties that its masthead was clipped by a revolving blade, then, although to lose the radio aerial would not itself be catastrophic, the loss of the ability to communicate with the coastguard might be catastrophic if the vessel was within the wind farm. The system being proposed necessitates the active participation of the skipper. If he cannot make a call, he cannot get himself rescued if he needs to be.

If a rotor tip were to collide with the top of a modern masthead or mast, I am absolutely confident that that would result in the dismasting of the vessel. My view and that of my colleagues is that if weather conditions were difficult, there would be a serious risk to the vessel and to the safety of its occupants. One of the most dangerous things that could happen would be for a vessel to be dismasted in circumstances where it could not easily and quickly clear the wreckage of the mast, which might rapidly hole the side of the boat, with the resulting loss of the entire vessel.

Mr Mackenzie: Do you consider that 2.1m is a satisfactory allowance for adverse weather or sea conditions?

Mr Eardley: I find it difficult to express a view on that. The original objection, as we framed it, related to a worst-case situation. We made the objection when we believed that the clearance height would be 25m, on the basis that it should provide for the worst circumstances in which a vessel might find itself.

I acknowledge the developer's point on this subject, on which we held informal meetings with the developer. I acknowledge that the worst-case scenario has a very small likelihood of coming about and of affecting a vessel in commission or in operation within the wind farm. However, it is foreseeably likely that, were a vessel to get into difficulties, there would be waves at that time.

I have no general conflict with Mr Badger when he says that the promoters think that the figure of 2.1m is a reasonable one when making an allowance for the possibility of winds, bad weather and waves.

Mr Mackenzie: Having regard to reasonably foreseeable circumstances, what would you consider to be a safe clearance distance?

Mr Eardley: There simply is no answer to that in figures. In our judgment, we must strike a balance between what we know to be the reasonable concerns of this and other developers where their construction costs and heights are concerned, and the desirability of ensuring that a vessel would not become dismasted if it came in close quarters of a working turbine system. The right approach, which I attempted to outline in my papers, is to fix the clearance height at a level that might not safeguard a very small number of vessels but that is at the beginning of the point in the curve, if you like, at which there starts to be significantly more vessels of that height. That is why we fixed on a figure of 22m for the worst conditions that one might reasonably expect to find.

However, we have had frank discussions with the developer about this, and a short time ago the developer told us that they would take a belt-and-braces approach to their 22m clearance proposal and introduce the active management system—AMS—on which they elaborated today. We discussed that at policy level and concluded that it would be right for us to agree to that compromise proposal. Were that proposal on the table today, I would have invited the proposers to join us in making a common position to the committee. However, that proposal is not on the table because the developers subsequently decided to reduce the clearance height by a further 4m. In my view, that is a step too far in reducing the safety margin.

Mr Mackenzie: In short, is it your position that 22m clearance would cover the bulk of boats, and for the boats that will be in the danger area, the fallback is the AMS?

Mr Eardley: We acknowledge that the strictly local use of this sea area is by vessels that are predominantly in the smaller categories of sailing boat. There are a few larger ones, but the vessels are predominantly in the smaller range.

On behalf of my organisation, I must be mindful of the fact that I am looking at the use of this site and, indeed, many others around the coast and many more to come and trying to establish what seem to us to be workable and safe arrangements. It is perfectly feasible for boats that are larger than those in the Solway Yacht Club fleet to navigate in this area; there may not be very many of them, but that might change in the future. There are changes in the patterns of leisure boating over the years.

The best guide that I can offer is to say, as I did in the papers, that there exists a ready-made database that for technical reasons could be called the IRC system. That is a rating measurement procedure, the details of which, with respect to the committee, I do not think we need be too concerned about. Our view is that because it is a mechanism for competition, it is a means by which boats of all kinds—the family cruiser, and the high-tech racing yacht—can race on equal terms. The IRC provides a handicapping system, and it is the one that is in most use. The boats in that fleet represent a reasonable picture of the kinds of boats that are generally in use around the coast.

It seemed to us that it was reasonable to put that picture forward, with the proviso that there are many more boats in general leisure use than are measured for competition purposes, which means that we have to apply significant multipliers to get some idea of the total number of boats. It is fair to say that only a small proportion of the total number of UK leisure boats will ever go near a wind farm in the Solway firth or anywhere else. Nevertheless, the approach that we have taken in coming to a view about what would be a safe clearance seems reasonable to us.

15:15

The Convener: I am not sure whether that answer was a qualified yes or a qualified no.

Mr Mackenzie: I am afraid that I have forgotten what the question was.

The Convener: It was to do with what clearance heights were acceptable.

Mr Mackenzie: I will try to summarise the situation. Is it the position of the RYA that 22m would be an acceptable clearance height, with the back-up of the active management system?

Mr Eardley: Yes.

Mr Mackenzie: That is the position that you indicated to the developer earlier.

Mr Eardley: Yes.

Mr Mackenzie: On the subject of decommissioning, since you wrote your precognition, matters have moved on somewhat. Do you have anything that you would like to say briefly on decommissioning?

Mr Eardley: I listened with interest this morning to what Mr Home Robertson said. He said everything that I would want to say to you on how the issue of decommissioning should be approached. We have raised the issue, which we think is important and valid. The committee has asked questions about how the mechanism might best be achieved for ensuring that, if a developer went out of business and no other developer wanted to take on that business, there would be a fund available to ensure that the vacant and unused wind farm did not become a navigational hazard.

Mr Mackenzie: Do you have anything to add to what Mr Copland will say on the subject of marking and notification?

Mr Eardley: No. I have left that matter up to him.

Mr Mackenzie: I have no further questions.

Mr Trinick: I would like to get one or two preliminary points straight. Do you agree that we now have an agreed form of undertaking relating to consultation on marking and lighting and that that has been delivered to the committee?

Mr Eardley: Yes.

Mr Trinick: Although Mr Copland speaks for the Solway Yacht Club, would you agree that that agreement is with the Solway Yacht Club as well as the RYA?

Mr Eardley: The SYC's objection related to marking and lighting. We were invited to say whether we wished to be party to the undertaking. We would be happy—

Mr Trinick: It was a short question, Mr Eardley. Do you speak for the SYC in giving your views or only for the RYA?

Mr Eardley: I am not formally charged to speak for the SYC, but my understanding is that Mr Copland is happy—

Mr Trinick: You have given me the answer. I will address other questions to Mr Copland.

On decommissioning, if the bill, the FEPA licence, the section 36 consent or whatever—that does not matter for the purposes of this question—made arrangements for financial security for decommissioning promises in advance of the commencement of construction that will ensure the removal of all elements of the wind farm below mean high water at any time and for whatever reason those structures become redundant following or during construction, would you be satisfied?

Mr Eardley: For whatever reason? Yes.

Mr Trinick: Your answer seems clear—was the question clear to you? I want to ensure that there are no differences between your understanding of the situation and mine. I asked whether you would be satisfied if, regardless of whether the structures became redundant because the wind farm had reached the end of its natural life, because the company went into receivership or liquidation and no one bought the project as a going concern or because of some other unforeseen circumstance, there were effective financial security to ensure the decommissioning of the plant.

Mr Eardley: Yes. The mechanism does not worry us. That is not our field of comment.

Mr Trinick: I agree. Will you be content with the situation, provided we achieve those ends?

Mr Eardley: Yes.

Mr Trinick: Let us turn, then, to the first of the two topics on which we probably will not reach agreement quite so easily—the minimum blade clearance. My starting point is the navigation emergency management system—NEMS, we shall call it—proposed by the promoters and agreed to by the MCA.

We will go to paragraph 2.26 of your main precognition, which is on page 15. I only rehearse this point because you covered things quite usefully with Mr Mackenzie. You say in paragraph 3.26 that you have indicated to the promoters that

"provided such a system has a high likelihood of reliability"—

I note that you do not say a "complete assurance", but a "high likelihood of reliability"—

"we would accept this as the means of ensuring the safety of vessels".

I think that, in paragraphs 8 and 9—I will not go to them, to save time—on page 3 of your additional precognition, you rehearse much the same position. To complete the preliminary rehearsal, in your evidence in Dumfries on 11 November, you said:

"That said, it is not possible to specify precisely what would be a safe clearance height. That is a matter of judgment, based on the likely use of the area by the kinds of vessels affected."—[*Official Report*, *Robin Rigg Offshore Wind Farm (Navigation and Fishing) (Scotland) Bill Committee*, 11 November 2002; c 14.]

Mr Eardley: Yes.

Mr Trinick: That is the background to where we are today.

Mr Eardley: Yes.

Mr Trinick: Do we agree that the management system would be available to all vessels that were able to make a distress call to the maritime rescue co-ordination centre?

Mr Eardley: Yes.

Mr Trinick: In paragraph 5 of your additional precognition, you record that boats with an air draught of 18m will be roughly between 12m and 17m in length. That is not a precise size.

Mr Eardley: Yes.

Mr Trinick: I suggest that boats of that size will almost certainly be equipped with VHF radios.

Mr Eardley: Yes. It is highly likely.

Mr Trinick: I understand that it is a requirement of membership for some yacht clubs that boats have VHF transmitters.

Mr Eardley: I am not aware of that. I cannot really comment on it. I do not know.

Mr Trinick: Very well—if you do not know, you do not know. That is okay.

Of itself, the proposed reduction in the minimum blade clearance from 25m to 22m to 18m will have no impact on the operation of the management system. It will be effective whatever the blade height.

Mr Eardley: Yes. I think it would have an impact.

Mr Trinick: I am sorry—are you saying that it would be effective?

Mr Eardley: We have heard that the management system is in the process of being worked out. It would be unfair to say that it is a child of the imagination, but there is none in operation anywhere. It is in the process of being designed. We think that a careful, precautionary approach should be taken to relying on it.

However, in the interests of trying to be helpful to the proposal, we have said in paragraph 3.26 of my precognition that for boats whose air draught is lower than but close to the intermediate proposal of 22m, we would accept that that is a reasonable compromise arrangement, because there will be very few of them navigating in the area and because it is overwhelmingly likely that they will have operational VHF radio. The lower we go, the more boats we bring into the affected category and the more risk there is that something will go wrong, such as their radio not working.

Mr Trinick: Fine, but that was not quite the question that I asked you. This is perhaps an obvious point, but let us get it ratcheted: if you have an effective navigation emergency management system—indeed the MCA has confirmed in writing that that will be feasible and effective—the mast clearance height is, in that respect irrelevant, because the NEMS operates independently.

Mr Eardley: With respect, I disagree profoundly.

Mr Trinick: If it is effective—

Mr Eardley: I was disturbed this morning to hear Mr Badger say that he was prepared to rely on his emergency management system, irrespective of the clearance height. I have not heard a more profoundly damaging statement in the whole of this inquiry.

Mr Trinick: You mistake my point; it is rather more simple than that. If an emergency system is operating and works, the reduction of the blade clearance height from 25m to 22m to 18m has no direct impact on the operation of that system.

Mr Eardley: As far as I understand it, it does not have any effect on the design of the system—on how the system is designed to operate.

Mr Trinick: Very well. I turn to the need to provide back-up to the system, which I think is where you want to go and I will take you there now. You have heard Mr Cubbin say that no system is completely safe and I think that we can agree on that. No system is completely foolproof; things will break down from time to time, but I do not think that either you or the MCA are aiming for 100 per cent certainty.

Mr Eardley: No.

Mr Trinick: A "high likelihood" is the term that you use in your evidence.

Mr Eardley: If Mr Cubbin says, as he has, that his organisation believes that the communication links in the process can work, we are happy to accept that.

Mr Trinick: Thank you. I turn to the evidence from Mr Badger on collision risk. You may have your doubts about Mr Badger's collision risk assessment and that is fair enough. However, I have not heard in questions to Mr Badger or in questions to you from Mr Mackenzie any evidence that fundamentally challenges that risk assessment or the conclusion that once in 2,025 years there will be a greater than 10 per cent chance of a collision.

Mr Eardley: I will give you my view on that, if I may. My understanding is that Mr Badger's analysis in one of the closing paragraphs, which I do not have before me, posits a situation with a theoretical local boat pool of 510 vessels whose air draughts are within the category 18m to 22m—I stand to be corrected, but we are talking about the larger category anyway. If those vessels were navigating what I would call purposefully but randomly—they intend to go where they are going, but they are going blindfold, because they do not know about an invisible wind farm that is in their way—they would have to navigate for 20 years every weekend and during the week before the chance of one of them hitting a rotor blade rose to 10 per cent.

I stand to be corrected if I have that wrong, but that is my understanding. I find that implausible. I cannot put it any other way. I am not a statistician, so I am not in a position to challenge the evidence from a statistical point of view. I simply say that I find it implausible.

Mr Trinick: Okay. Following the exchanges this morning and this afternoon on blade clearance, I think that the position between us is terribly clear, so I shall move on to exclusion zones. As you said at the Dumfries meeting on 11 November, the RYA's objection to exclusion zones is to some extent "a matter of philosophy".

Mr Eardley: Yes.

Mr Trinick: It is an article of faith of the RYA.

Mr Eardley: It is not entirely an article of faith, but it is an article of philosophy.

Mr Trinick: Let us not get into numbers, but the RYA represents one part of one set of users of the sea—yachtsmen, but not all yachtsmen.

Mr Eardley: Our membership is close to 100,000 personal members, and substantially more people are involved. Not everyone is a member by any means.

Mr Trinick: As you record in paragraph 2.28 of your precognition, there are many other users of the sea. There are those who set forth on the sea who are not as responsible as members of the RYA are and who

"flout sea safety rules … in an outrageous way".

Mr Eardley: I said that in the context of commenting on evidence that was presented at Dumfries about what I call the "antics" of jet-skiers.

15:30

Mr Trinick: Does not what you say in your evidence reflect the evidence of Mr Copland? The evidence that he gave in Dumfries, which was based on his local experience, recorded quite alarmingly the antics not only of jet-skiers but also of powerboat users. He said that there was a growing number of incidents of

"jet-skiers transiting between the Galloway coast and the English coast",

and that he had

"nightmares in which jet-skiers assemble on either side of the Solway and slalom race around the wind farm pylons."—[*Official Report, Robin Rigg Offshore Wind Farm (Navigation and Fishing) (Scotland) Bill Committee*, 11 November 2002; c 20-21.]

That is his local knowledge, and those are the nightmares that he has. There are users of the sea other than the responsible RYA members.

Mr Eardley: Yes. My comment in that context is that my own view, and the view of my organisation, is that that mischief is de minimis in relation to the problems that the developers might have when the site is operational.

Mr Trinick: We have to balance that view against Mr Copland's view, which is based on his experience of activities in the Solway, do we not?

Mr Eardley: With respect to Mr Copland, he is not the operator of the wind farm.

Mr Trinick: I have just one or two further points. In paragraph 2.34 of your evidence, and in the table on page 9, you record what other promoters have done as far as exclusion zones are concerned. I am grateful to you for producing that information. It is quite clear that most promoters—nine out of 12 on your list—in the current, or first, round of offshore wind farms have sought construction exclusion zones.

Mr Eardley: Yes. The numerical majority has done so, but the pattern is mixed.

Mr Trinick: Okay. It is mixed. Seven out of 12 have sought operational exclusion zones.

Mr Eardley: Yes, if that is what it adds up to.

Mr Trinick: Out of interest, in relation to Gunfleet sand, are you sure that you are correct that there is no operational exclusion zone?

Mr Eardley: You are quite right to pick me up on that point, and I apologise for not leading with it. In the Gunfleet, there is another piece of plant, the operation of which I am not familiar with. It is a substation of some kind, and the developers want an operational exclusion zone around it. I have not yet seen the environmental impact statement, so I do not know quite what it is about. As far as the masts are concerned, however, I believe that there is no operational exclusion zone. That is my understanding.

Mr Trinick: What have you seen in order to form the views that are set out in your table?

Mr Eardley: The order under the Transport and Works Act 1992.

Mr Trinick: I see.

Paragraph 2.39 contains your suggestion for an alternative provision for the bill, but we have to treat that a bit carefully. What is suggested would not address the user of the sea who navigates in defiance of common sense within, shall we say, 350m of a construction area—the area that we would otherwise be proposing as an exclusion zone—but who is not physically obstructing the works. Such a person would, nonetheless, be straying into danger in a way that causes construction activity to cease in order to avoid danger. Am I right in saying that?

Mr Eardley: I may be wrong, but I made the assumption that the building site, as Mr Steele described it, will have one or more patrol vessels on standby all the time. The developers who are seeking those regulatory provisions—and by no means all of them are equally concerned—will be mindful of the risks and will be ready not only to warn off transgressors but also to gather evidence sufficient for prosecution. If somebody came within what, according to the reasonable view formed by the developer, was an unsafe distance, they would be warned. If they refused to go away, evidence could be taken of their presence.

Mr Trinick: Just hold fire a minute: that was not what I asked you. The offence that you have in mind is one of obstruction, which implies an intent. If a user of the sea is navigating within what is clearly an unsafe distance—he might win the Darwin prize; I do not know—but is not obstructing the works, what can be done?

Mr Eardley: The suggestion in my precognition is:

> "Any person who … in any other way interferes with any of the authorised works or their operation
>
> shall be guilty of an offence".

Mr Trinick: You are envisaging a situation in which there is no exclusion zone. I am driving at this: if there is no exclusion zone, what civil wrong is being committed by a person navigating a vessel close to construction works, given that there is no law of trespass on the sea?

Mr Eardley: None. However, that person would be laying themselves open to an allegation that they had committed what I broadly call an offence of criminal trespass.

Mr Trinick: Let me put an example to you. Someone is out for a weekend of sailing and fishing. They moor up, by sea anchor or other means, or drift down on fish in the area of the wind farm, some distance from the turbine installation itself. Clearly, that person is obstructing operations, but not physically or intentionally. That person is fishing away happily and is oblivious to the situation. In the absence of an exclusion zone backed by penalties, what can the constructor legally do to remove that vessel?

Mr Eardley: With respect, I find that scenario a bit implausible.

Mr Trinick: You may find it implausible, but deal with the question, please. What would you do to get that vessel removed in the absence of an exclusion zone backed by penalties?

Mr Eardley: The operational site manager would have to be prepared, after issuing whatever warnings they thought appropriate, to gather evidence that such people were unreasonably

interfering with the works. Then, in what I think is the unlikely situation of their not moving on having been sternly asked to do so, the remaining whatever percentage of people who wilfully and persistently stayed and fished or continued with their Sunday afternoon jaunt in disregard of that sensible advice would be told that the site manager had the evidence and would prosecute them if they did not moved when asked to do so.

Mr Trinick: But if no criminal offence is being committed, given the lack of an exclusion zone, and if there is no law of trespass on the sea, the person in such a vessel is exercising his common-law public right of navigation. In the circumstances that you envisage, we are then left with an argument that will be difficult to resolve, or that, at any rate, will require cost and the involvement of the courts. The result cannot be predicted: there might be arguments over whether the person was wilfully obstructing the works or was just there fishing. If there is an exclusion zone, there is certainty, is there not?

Mr Eardley: Not entirely—I do not think so. I think that, in that case, there would be arguments about whether the person concerned was inside or outside the zone.

Mr Trinick: Our differences are clear, then.

Mr Eardley: Such matters would be easier to determine during the construction period rather than the operational period.

Mr Trinick: I return to paragraph 2.38 of your precognition, which says:

"Several of the other developers applying for consent via the Transport and Works Order route have included in their draft Orders a penal clause",

which you go on to set out. I think that you may have omitted to say that the same developers have also applied for exclusion zones. That is so, is it not?

Mr Eardley: That was not an intentional omission.

Mr Trinick: But that is so, is it not? I am not accusing you of anything, Mr Eardley—these things happen. The developers who have applied for penal clauses in the form that is set out in your precognition have, in the same orders, applied for exclusion zones.

Mr Eardley: I have not got in my mind a complete picture of all the applications but that is likely to be the case.

Mr Trinick: In paragraph 2.6 of your precognition, you address other marine works, such as dredging for marine aggregates. If you do not know the answer to this question, please do not guess—just say so and I will stop. In fact, I will simply ask you a question that you will know the answer to. Have you been involved on behalf of the RYA in formulating responses to marine aggregates applications?

Mr Eardley: Yes.

Mr Trinick: Are you aware of how marine aggregates operations are consented?

Mr Eardley: Only in broad terms. We are not involved in the consenting process other than being asked for our view on the navigational effects of those operations.

Mr Trinick: If I ask further questions, I might be tempting you to go down an unsuitable path, but I will try one more, nevertheless. Do you know whether orders under the Transport and Works Act 1992 are used in relation to marine aggregates?

Mr Eardley: I do not believe that they are.

Mr Trinick: We have an answer. If they are not, how on earth would an exclusion zone be secured, given that there would be no statutory powers to do so?

Mr Eardley: That was not quite the point that I was making in paragraph 2.6. I was not paying any attention to whether a particular regulatory mechanism is used; I was saying that, from our practical experience as navigators and as participants in consultation processes for those applications, it does not appear to us that it is necessary for such marine operators to seek the same remedies that you are seeking.

Mr Trinick: I understand the point. My point to you is that they could not do so. As they are not seeking statutory powers, they will not be able to propose exclusion zones.

Mr Eardley: But then neither—

Mr Trinick: Could you wait until I have asked my question?

Mr Eardley: Sorry.

Mr Trinick: Do you agree that the fact that there are no exclusion zones in relation to the projects that you deal with in paragraph 2.6 might speak to the fact that there cannot be any rather than the fact that the operators chose not to propose them?

Mr Eardley: I do not know whether it would be open to such developers to apply for a transport and works order to secure an exclusion zone. Perhaps it is open to them to do so but the developers simply do not think that it is worth the bother. For example, many wind farm developers have not gone down that route but have chosen to manage without exclusion zones. Indeed, some developers have said that they are pleased to do so. In the public sea safety seminar that was held a few weeks ago in north Wales, the North Hoyle

wind farm developer said that there would be no restriction on people who want to sail through the wind farm.

Mr Trinick: We are happy to agree with that developer. That is the situation that we propose in the bill.

Thank you for your help, Mr Eardley. I am sorry that I had to drive you hard, but I was conscious of time.

Mr Rumbles: I would like to pursue the issue of the exclusion zone and the alternative that Mr Eardley proposes in paragraph 2.39 of his precognition, which refers to

"Any person who without lawful authority or reasonable excuse … in any other way interferes with any of the authorised works or their operation".

At first glance, the proposal seems likely to be successful in keeping people away from the wind farm. However, as I understand it, Scots law requires proof of an intention to commit a criminal offence. I see Mr Mackenzie shaking his head, but that is my understanding. If it were not for that fact, I might be tempted by that alternative proposal.

Originally, I was attracted by the idea of a large exclusion zone because we do not want people sailing between the turbines because of the catastrophic consequences that might come about if we got the blade length wrong, for example. However, the options before us are to have 60 exclusion zones or Mr Eardley's alternative suggestion.

Mr Eardley, could you comment on my worries about the need for proof of an intention to commit a criminal offence?

15:45

Mr Eardley: I will try to, but I would like to make a brief point first. I hoped that my suggestion would be helpful. I have no doubt that the drafting could be tidied up to suit the circumstances. It is not a final draft; it is just a suggestion.

You asked about the mens rea, which is the phrase, if I remember my criminal law correctly, for the intention to commit a criminal offence. The developer has said here and in paper correspondence with others that it would not be the intention automatically to prosecute anybody who appeared to be committing that particular offence. The developer would do what it could to ask, persuade, warn, threaten and eventually prosecute in that order. In the course of that process of persuasion, it should, I would have thought, become abundantly clear that the person who refuses to accede to the sensible advice given by the developer is forming the intention to commit the offence.

Mr Rumbles: In Scotland, of course, it is the procurator fiscal who decides whether somebody is to be prosecuted. That is quite important.

Mr Eardley: Okay. The developer would simply lay the information on which the authorities would decide whether there was sufficient evidence to warrant a prosecution. As I understand it, that is generally the way in which criminal law is enforced in terms of public order matters as opposed to personal crimes. I would have thought that that ties in rather well with the way in which the developer has explained previously that it foresees the informal regulation of the sites working.

Mr Rumbles: With an exclusion zone, it is clear: either the person is in an exclusion zone or they are not. They do not have to prove intention. That is what I was trying to get at with my question on your alternative.

Mr Eardley: With respect, that appears to be a simple solution, but our experience is that the realities of the sea and its use dictate otherwise. In a still-water, afternoon-fishing situation, it may well be reasonably easy to make a judgment about whether somebody is in an operational zone or unreasonably interfering with the progress of works. The operator may form that judgment and be confident about it—I am talking now about the construction exclusion zone; there will not be anybody in the operational exclusion zone. If the person is asked to move away, navigate round the zone or cease doing whatever they are doing that is getting in the way and they wilfully refuse to do that, and if the evidence is available, such as the personal evidence of a mate or the skipper, photographic evidence or evidence from a video camera, that would amply support any prosecution that the procurator fiscal decided to mount.

The Convener: As there are no other questions, I thank you very much, Mr Eardley.

Our next witness is Mr James Copland, on behalf of the Solway Yacht Club. Mr Copland will give us some information on the club's objections, specifically on marking and notification.

MR JAMES COPLAND *took the oath.*

Mr Mackenzie: Mr Copland, you have lodged an objection to the bill on behalf of the Solway Yacht Club, in relation to marking and lighting. Is that correct?

Mr James Copland (Solway Yacht Club): That is correct.

Mr Mackenzie: Various discussions have taken place, resulting in a proposed undertaking, which is contained in a letter to Mr Eardley from Paul Irving of the promoter's parliamentary agents dated 21 February 2003. The committee members have a copy of that letter. You have had an opportunity to consider that undertaking. Are you happy with it?

Mr Copland: I have had an opportunity to look at the undertaking from the developers, written by John Kennedy & Co. I can inform you that, as far as the Solway Yacht Club is concerned, the undertaking that is contained in John Kennedy & Co's letter is sufficient to meet the objections that we lodged against the bill.

The Convener: Thank you very much. That will probably negate the need for other questions, but I may be being presumptive.

I ask the promoter's representative to come back and submit closing evidence. I do not know whether Mr Badger or Mr Steele will do that.

Mr Trinick: By all means, convener, I will call them for your questions, but I have nothing to ask of my witnesses at this stage. I decline the opportunity, but the witnesses are obviously available for your questions.

The Convener: Do any members of the committee have further questions of the promoter? Does Mr Mackenzie have further questions?

Mr Mackenzie: I have no further questions, thank you.

The Convener: That is very helpful, time-wise. Mr Trinick wants to make a closing statement.

Mr Trinick: I also ask for a five-minute comfort break before I do that, if I may.

The Convener: By all means.

15:51

Meeting suspended.

15:59

On resuming—

The Convener: I invite Mr Trinick to make a closing statement on behalf of the promoters.

Mr Trinick: It is quite right that a limited amount of time is available; that prevents the lawyers from taking over the proceedings. I will stick to some bullet points; I will certainly not attempt to summarise where we have got to on the evidence.

I will concentrate on exclusion zones and their enforcement, decommissioning, blade clearance and the NEMS. As we have reached a satisfactory stage, I will not cover the effect on the fishing effort, notification of exclusion zones, the marking and lighting of those zones and the effect on radar, VHF and GPS. I will also not deal with the risk of collision with wind turbines, other than the risk of collision between a moving blade and the mast—in other words, Mr Beattie's evidence.

Mast clearance came down from 25m—the figure that appears in the bill—to 22m. The present figure is 18m. The promoters wish that it were possible, in a fledgling industry, to be precise from the outset about the minimum clearance that is required. Regrettably, it has not been possible to do that. The Robin rigg project is not alone in having such teething troubles. We can now say that 18m represents the final position, as far as the promoters are concerned. If we have led the committee a bit of a dance on that point, we apologise.

There are two bases for the evidence on clearance. First, there is the quantitative risk assessment that Mr Badger carried out. Even without any management system, the minimum clearance of 18m would be adequate to ensure an acceptable level of safety. That conclusion is based on a collision risk assessment. Taking into account the percentage of vessels in the IRC fleet with the relevant mast height, as opposed to the percentage of those in the SYC fleet, it would take 2,025 years for the possibility of a collision to exceed 10 per cent. Mr Eardley might find that implausible, but he can offer no evidence from the collision risk assessment to counter that.

The assumptions that Mr Badger used have resulted in an overstatement of the collision risk—in paragraph 10 of his precognition—by a factor of between 10 and 100. By implication, that allows for a certain increase in the number of relevant vessels for the period of operation of the wind farm.

In spite of that conclusion, we have proposed a management system that will actively assure a means of avoiding collision between moving blades and such vessels as might be at risk. The evidence of the collision risk assessment indicates that that precautionary measure might never be activated. The system is workable and the MCA has confirmed, in writing, that it is feasible and effective. In my view, the promoters have demonstrated satisfactorily that the risk of a collision between a moving blade and any vessel has been adequately addressed.

We have given some thought to the mechanics of how we can take forward the management system in the bill. We propose that the principles of the management system should be included in the bill, although the details will have to be approved later. On behalf of the promoters, I undertake that there will be consultation with the RYA, and with other appropriate bodies that the committee notifies to us, in advance of the submission of those details for the approval of the Parliament or of the Scottish ministers, whichever the committee considers appropriate.

As regards exclusion zones, the evidence from Mr Steele was both detailed and persuasive, and I commend it to the committee. I do not think that there is any argument about trawling and

anchoring; it seems a sensible way to avoid danger. The notion of construction and operation is not completely new. Although it applies outside territorial seas, article 60 of the UN Convention of the Law of the Sea specifically envisages the need for safety zones on occasion, to manage the potential for danger. That is operated through the HSE. The Commissioners of Northern Lighthouses also specifically supported exclusion zones in Dumfries on 11 November. I do not find any objection to them in the evidence of the Solway Yacht Club; it was the RYA that objected.

The exclusion zones would address real issues of safety for vessels navigating too close to the wind turbines. Wind farms are a new form of development in which any uncertainties about safety must be adequately addressed at this stage in the interests of the safety of all users of the sea. While it is quite clear that most people who set forth on the sea are responsible, there is equally clear evidence that some are not. That evidence comes from the Solway Yacht Club.

I think that there are some problems with Mr Eardley's suggestion of an alternative offence. On balance, I could agree that the offence does not require intent. If any of my questions to Mr Eardley implied the contrary, I may have misled the committee. Intent is not necessary for the commission of an offence.

However, it is clear that the offence that Mr Eardley suggests envisages physical interference or obstruction, not someone sitting out in a boat, several metres from construction operations or from a wind turbine. The offence, as drafted, has its roots in the Merchant Shipping Act 1995. In fact, it was drafted by the man sitting next to me—he wrote the act, so as to address interference with navigational aids. That offence was physical interference, rather than boats standing off and perhaps getting in the way. The difficulty with Mr Eardley's suggested offence is that judgments are still required and arguments can still arise. However the offence is drafted, was the man in the boat obstructing or just fishing? Was he interfering or did the construction vessel take a peculiar course that it need not have taken? Such arguments can and will arise. Exclusion zones provide certainty; that is why they are proposed.

Again, without exclusion zones, it is not possible to manage safety risk adequately. While deliberate damage to equipment can be managed under the existing criminal law, there is no concept of trespass in navigable waters. There is a common-law public right of navigation, which is paramount to the right of the Crown. There is no trespass. It is precisely because of that that any suggestion that Mr Mackenzie may make in a moment—which I anticipate, because he warned me—about the use of interdicts will not work, because there is no civil wrong in respect of which an interdict can be sought. There is no civil wrong being committed; there is no trespass; there is no interdict. Therefore, an exclusion zone is required to provide the basis for any action to prevent the dangers that are described in the evidence. The creation of an offence of infringement of any exclusion zone without reasonable excuse will be the only way of enforcing such a zone.

On the enforcement of exclusion zones, I simply commend the evidence of Mr Steele. I will not rehearse again the process of reporting to the MCA, the collation of evidence and the presentation of the procurator fiscal.

The promoters accept fully the need to secure decommissioning promises before construction starts. That approach is reflected in the existing draft FEPA licence. That is the final draft, by the way; we have a high level of confidence that it will be issued in its current form, should the minister decide to issue it. We also see the approach that we wish to take reflected in the statements from the section that deals with energy consents under section 36 of the Electricity Act 1989.

How decommissioning will be secured financially depends on a variety of factors that we do not now know, such as the programme for construction and how the project will be financed. Therefore, it is desirable to allow flexibility at this stage. I ask the committee not to put a provision in the bill because, if the matter is addressed in the bill, there will not be flexibility and we will not be able to react to project finance or bank lending circumstances. I ask the committee to leave that to the ministers to deliver. We know—we are confident—that there are a variety of mechanisms to achieve what is needed. If we are wrong, we do not have a project, because the licence requires this position to be secured before construction commences.

There is a remaining concern, which we heard loud and clear during members' questions, that members of the public should be assured that decommissioning is adequately secured before construction starts. We are open to suggestions, and I put one on the table now. We will undertake to consult the RYA, the Cumbria Sea Fisheries Committee and such other bodies as the committee notifies to us on the terms of the decommissioning financial security in advance of submitting those suggestions to the Scottish ministers prior to construction. That will bring in the public, at least through certain bodies, in some way. However, we are open to other suggestions.

Mr Mackenzie: There is only one preliminary matter to deal with regarding Mr Gallagher's evidence. I indicated that I might have to read his precognition and ask him further questions. I have no further questions to ask him, subject to

clarification of one matter, which I have agreed with Mr Trinick. Mr Gallagher spoke of the results of tests that had been done on wind farms, but no wind farms have yet been built in UK waters. I would not want there to be a misapprehension about that.

On clearance, the first of the three areas for discussion, Mr Eardley spoke of taking a careful, precautionary approach, and I respectfully invite the committee to take such an approach to that issue. The committee might ask itself what risks are reasonably foreseeable. Based on the evidence to which Mr Eardley spoke, the RYA proposes that a clearance height of 22m would represent a reasonable precautionary approach. When one has regard to other factors such as adverse weather conditions, that would still mean that most yachts would be below the clearance where a collision might occur.

In respect of those yachts with masts that would be high enough to be involved in a possible collision, the fallback would be the emergency management system. The RYA asks that its request that the management system be binding upon present and future operators be recorded in some way. I am not sure about the best way of doing that, but that is a concern of the RYA. Our second concern is that it should be made clear that the ultimate decision concerning which turbine or turbines are shut down must rest with the Maritime and Coastguard Agency.

On the question of exclusion zones, the RYA's submission is that such zones are both unnecessary and unworkable. They are unnecessary in the sense that, as the RYA respectfully submits, the public right of navigation is an important right that should be taken away only when the case for taking it away on the grounds of safety has been made. Although there may be a superficial attraction to the creation of exclusion zones to increase or improve safety, the RYA's position is that such zones are unlikely to reduce materially the risk of collision.

I submit that, if a collision occurs, it is likely to be the result of a combination of circumstances—for example, a vessel that has lost its power in stormy seas may have an inexperienced or incompetent crew. I respectfully suggest that the existence of an exclusion zone on a statute book would neither deal with that set of circumstances, nor materially lessen the likelihood of a collision. In short, it might be said that the provision of exclusion zones is a sledgehammer to crack a nut. Even then, I do not think that the zones would do that very effectively.

16:15

People have referred to oil rig exclusion zones. One might be able to learn something from that approach, but there are a number of important and rather obvious differences between offshore installations such as oil rigs and offshore wind farms. For example, most oil rigs are manned by up to 100 or 200 men; there is a real and serious risk of explosion; the rigs are located in deeper waters where there are larger, heavier ships; and there is a risk of marine pollution if wellheads are knocked off. As a result, I respectfully submit that the scrutiny of oil rig safety zones does not provide much guidance for this development.

As for available alternative measures and remedies, people have referred to the existing practice in the notice to mariners. The RYA's position is that as such notices have worked in the past, why should they not work in the future? I think that there was more reference at a previous meeting to areas that should be avoided.

As far as civil remedies are concerned, this is probably not the place for the committee to hear a detailed exposition of the law; indeed, the committee might wish to seek its own legal advice on the remedies that might be available under the existing law. However, it might well be open to the developer to seek an interdict if someone interfered with its operations. We could get into legal arguments, which might be interesting or otherwise, but if a bill were passed that gave a developer the power to undertake such works, I would be very surprised if the judge in the Court of Session would allow a nuisance protester or someone to prevent the developer from going about its lawful business. The whole point of the bill is to authorise the developer to obstruct navigation and fishing, so any nuisance protester would not be able to say, "I have the right of navigation and fishing." The Parliament will have taken that right away. As I said, this is perhaps not the time or the place to get into nice legal arguments. For what it is worth, my opinion is that interdicts—including interim interdicts, which can be sought the day after an incident—seem to provide a possible remedy.

Remedies might also be available under criminal law. I am no expert on criminal law, but having looked at a standard textbook on the subject, I know that various remedies might exist. For example, under the common law of malicious mischief, there is a criminal offence of causing economic loss to another in the absence of actual damage to property. As a result, I question whether there has been proper consideration of the existing civil and criminal remedies and whether there is a need to change the law.

The RYA's position is that exclusion zones are unlikely to be workable. I respectfully suggest that the provisions do not meet the requirements of legislation to be clear, workable and proportionate to the mischief that is sought to be prevented.

During the construction phase, there will be moving exclusion zones; I am not certain how many there will be or how often they will be implemented. That said, the 60 or 62 operational exclusion zones will be fairly unworkable.

For example, I am not sure how one will be able to tell when a vessel is within or outwith the 50m boundary. In many cases, it must be difficult to judge that at sea. On exclusion zones, the RYA respectfully suggests that there are ways of dealing with problems that might be envisaged. The case has not been made for introducing a fairly fundamental change in the law. Before leaving the subject, I should say for completeness that no objection is made to exclusion zones for trawling and anchoring.

The RYA raised at the outset the subject of decommissioning and the guarantees that might be in force, because the question of what happens to the works at the end of their operation—whether that be in 20 or 25 years' time, or sooner, if the developer becomes insolvent—is important. To be fair, that point has been taken on board.

If the need is acknowledged for a suitable guarantee that funds are in place to remove the works—whether at the end of their useful working life or sooner, on insolvency—the RYA asks for that need to be recorded somewhere. Whether the mechanism were included in the bill or in the FEPA licence, if the need were recorded, it could not be said later—perhaps by the Scottish ministers—that because the committee considered the matter and did not insist on provision in the bill, the matter is not important.

That is the extreme position, but we do not want the matter to be forgotten. One way of ensuring that it will not be forgotten is to record the need for a suitable guarantee. I understand from Mr Trinick that the terms of the licence have been agreed, but the form of the guarantee and the funding that is to be put in place have not been agreed, so that remains a live issue.

Item in Private

The Convener: Does the committee agree to meet in private on 6 March to consider our draft report?

Members *indicated agreement*.

The Convener: I thank the members of the public who have been with us all through today's proceedings, which have been extremely complex at times. I hope that they have not found the proceedings too dispiriting. I thank everyone who has given evidence and I thank Mr Mackenzie and Mr Trinick for the way in which they have gone about their business, which has been appreciated.

16:22

Meeting continued in private until 16:43.

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